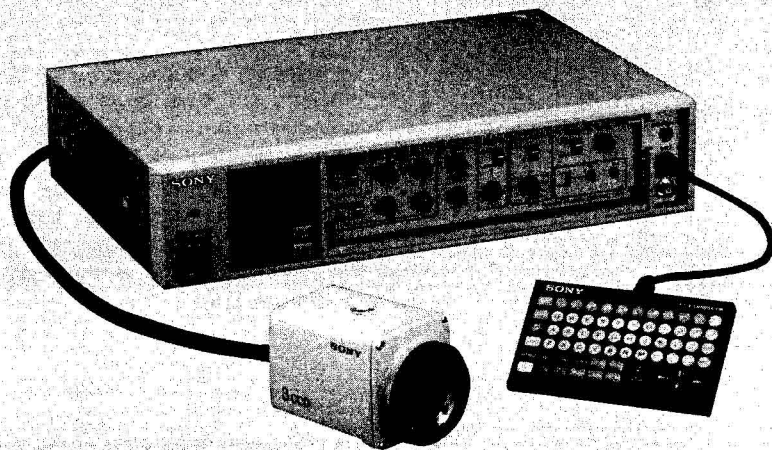


**3 CCD VIDEO CAMERA
TITLE GENERATOR**

DXC-755P TGR-750



SONY[®]
SERVICE MANUAL

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CHAPTER 1 OPERATION

1-1. OUTLINE

The DXC-755P is a color video camera which uses three CCD (Charge Coupled Device) solid state image sensors having 450,000 effective picture elements.

Thanks to small-size and light-weight, the camera head can be connected to an operation microscope, an endoscope or others to reproduce the details of an object in high quality. Precise adjustments of picture quality according to the shooting conditions can be remotely controlled by a multi-function camera control unit.

The DXC-755P has the following features.

High light sensitivity camera head adopting a HYPERHAD sensor providing 450,000 picture elements

- A HYPER HAD sensor provides the camera with high sensitivity and less smear, and it is possible to shoot under low light conditions.
- The horizontal resolution of 750 lines reproduces the details of an object in high quality.
- Thanks to the high signal-to-noise ratio, the video gain can be increased, which makes it possible to shoot a picture under low light conditions.
- Small-size, light weight and lower power consumption.

Various adjusting functions

- Various adjusting functions such as automatic or manual black balance, white balance and iris adjustment, selection of video output level, pedestal level adjustment, allow the precise adjustment of picture quality.
- Gamma correction circuit and linear matrix circuit can be cut off to obtain a signal without correction. The signal is used for processing or measuring a picture with a computer.
- The built-in knee selector provides two positions; LOW and NORMAL, which can reproduce the natural picture with the details of the white parts under over-light conditions.

Multiple output signals

- Four kinds of video output signals—composite video signal (VBS), component video signals, Y/C signal and RGB signals—are available so that the camera can supply a high quality picture to the various kinds of signal format system.
- A clock signal synchronized with the CCD driving clock can be output. When the clock in a computer is synchronized with this clock, a picture can be processed or measured in the unit of a picture element.

Gen-lock function

The camera can be locked with an external reference signal. When two or more cameras are used or when a camera is connected to the picture processing equipment, the camera and other equipment can be synchronized with a reference signal.

Electronic shutter

Electronic shutter with 7 steps of the speed from F.L (flickerless; 1/120) to 1/10000 second enables the camera to produce clear images in still or slow-motion playback even when the objects are moving at very high speeds.

Title display

With the supplied title generator, characters of alphabets or figures or time can be superimposed on a picture picked up by a camera. It is also possible to superimpose a picture generated by an external title generator on a camera picture. (Refer to "Chapter 2. How to Use the Title Generator".)

1-2. BEFORE THE USE

Precautions

On safety

- Operate the unit only with a power source specified in the "Specifications" on page 45.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

On installation

- Allow adequate air circulation to prevent internal heat buildup.
- Do not install the unit near a heat source such as a radiator or an air duct, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Keep the unit away from equipment with strong magnets as for example a large loudspeaker.

On operation

When the unit is not in use, turn the power off.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with mild detergent solution.

On transportation

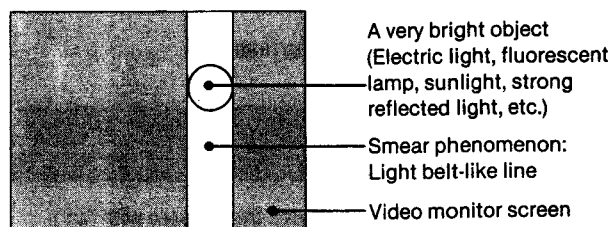
Save the original carton and associated packing material. They will be useful when you transport or ship the unit.

Special Characteristics of a CCD

The following phenomena may appear on the monitor screen while the video camera is used. These phenomena are not indicative of a camera malfunction.

Smear phenomenon

This may appear when a very bright object is shot.



White dots

White dots may appear on the screen when the camera is operated at high temperature.

Wavy picture

This may appear when fine stripes, straight lines, etc., are shot. Their images monitored on the screen look wavy.

Safety Information when the DXC-755P is Used as a Part of a Patient-related Circuit

Electric appliances applied to a patient may create hazards for both the patient and the operator unless the equipment is suitable for the application and the operator is skilled in its use. Follow these instructions to ensure safe operation and to retain the camera in a safe condition.

Warning

The camera head and the camera control unit are not explosion proof. Do not use them in the presence of flammable anesthetics.

On current leakage

The earth leakage current does not exceed 500 μ A rms at 240 V, 50 Hz.

On power supply

- This camera is compatible with isolated power systems as used in operating rooms.
In non-isolated power systems, the camera is intended to be operated from a single-phase ground-referenced power source having one current-carrying conductor (the neutral conductor) near ground potential.
- Inspect the power cord periodically for fraying or other damage, and repair as needed. Do not operate the camera from an AC power with a damaged power cord or plug.

On grounding

To ensure protection against electrical shock whenever auxiliary, line-operated equipment (e.g., VTR, color monitor) is electrically connected to the camera, the camera must be properly grounded. The camera power cord provides the required ground when properly connected to a hospital grade or hospital only AC outlet.

On connected equipment

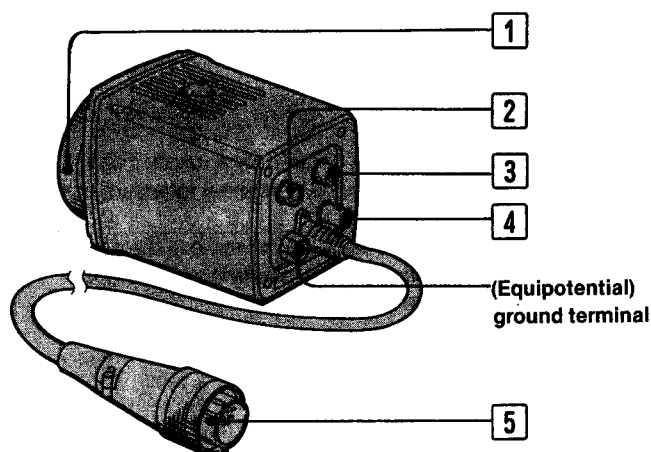
Within certain governmental jurisdictions, all interconnected accessory equipment must be labeled by an approved testing laboratory. After interconnection with accessory equipment, leakage current and grounding requirements must be maintained.

On repairing

- If the camera is dropped or severely abused, it should be checked by qualified service personnel to ensure that the safety features are intact.
- To prevent electrical shock, do not remove the cover. No user-serviceable parts are inside. Refer servicing to qualified service personnel only.

1-3. LOCATION AND FUNCTION OF PARTS

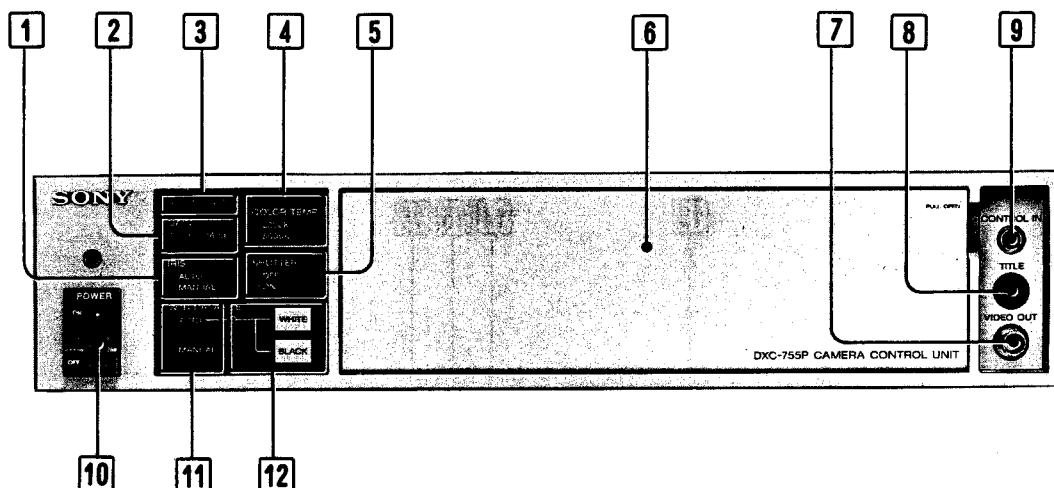
Camera Head



- 1 Lens mount clamp ring** (bayonet type) (P1-12)
Attach a lens with a bayonet type mount (optional) or an adaptor for a microscope (optional).
- 2 CONTROL connector** (4-pin)
To control the peripheral equipment of the camera head from external equipment, connect this connector to the peripheral equipment to be controlled. The external control signal that is input to the CONTROL IN connector on the camera control unit is transmitted to the camera head and is directly output from this connector. The control function and signal are not specified.
- 3 LENS connector** (6-pin) (P1-12)
Connect a cable of the lens.
- 4 MONITOR connector** (BNC type)
A monochrome video signal picked up by the camera is output. Connect to the video input connector of a video monitor to check the position of an object.
- 5 Connecting cable** (with a 26-pin connector) (P1-13)
Connect to the CAMERA HEAD connector on the camera control unit.

Camera Control Unit — front

- 1 IRIS AUTO/MANUAL indicators (P1-21)**
Show the setting of the IRIS AUTO/MAN selector **[16]**.
AUTO (green) is lit: The iris is automatically adjusted to the optimum value according to the video level input from the camera head.
MANUAL (orange) is lit: The iris is manually adjusted with the IRIS control **[15]**.
- 2 GAIN indicators (P1-22)**
Show the setting of the GAIN selector **[14]**.
The 0 dB indicator lights in green, and the 9 dB and 18 dB indicators light in orange.
- 3 LOW LIGHT indicator (P1-19)**
Lights in orange when a video signal level from the camera head is too low and the brightness of a picture is insufficient.
Adjust the iris when it is adjusted manually, or increase the video output level with the GAIN selector **[14]**.
- 4 COLOR TEMP (temperature) indicators (P1-18)**
Show the setting of the COLOR TEMP selector **[13]**.
3200K (green) is lit: Color temperature for indoor shooting is selected.
5600K (green) is lit: Color temperature for outdoor shooting is selected.
- 5 SHUTTER ON/OFF indicators (P1-24)**
Show the setting of the SHUTTER ON/OFF switch **[23]**.
OFF (green) is lit: The electronic shutter is not used.
ON (orange) is lit: Shutter speed can be selected with the SHUTTER speed selector **[24]**.



6 Cover panel

Pull the right side of the indication PULL OPEN, and the cover panel opens.
The panel can be stored in the unit by pushing it horizontally.

7 VIDEO OUT connector (P1-14)

A composite video signal picked up by the camera is output. The same signal is also output from the VIDEO OUT connectors (VBS1 and VBS2) on the rear panel.

8 TITLE connector (P1-13)

Connect the supplied title generator. Title can be superimposed on the video signal.

9 CONTROL IN connector

To control the peripheral equipment of the camera head from external equipment, input the control signal to this connector. The control signal is transmitted to the camera head through the connecting cable and is directly output from the CONTROL connector on the camera head.
The function and signal for control are not specified.

10 POWER switch (P1-18)

Set to ON to supply the power to the camera control unit, camera head, lens and supplied title generator.

11 W/B (white/black) BALANCE AUTO/MANUAL indicators (P1-20)

Show the setting of the W/B BALANCE AUTO/MAN selector **19**.

AUTO (green) is lit: White balance and black balance can be automatically adjusted.

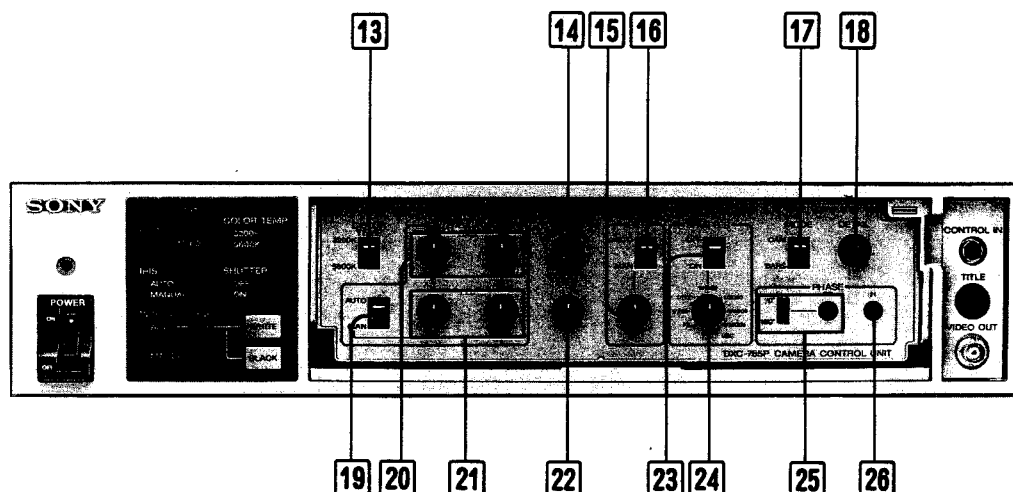
MANUAL (orange) is lit: White balance and black balance can be manually adjusted.

12 WHITE/BLACK buttons and indicator (P1-18)

To adjust the white balance or black balance automatically, set the W/B BALANCE AUTO/MAN selector **19** to AUTO, and press the WHITE or BLACK button.

When the adjustment completes, the indicator lights. If the adjustment cannot be completed, the indicator blinks.

Camera Control Unit — inside the cover panel



13 COLOR TEMP (temperature) selector (P1-18)

Set according to the lighting conditions.

3200K: For indoor shooting

5600K: For outdoor shooting

14 GAIN selector (P1-22)

If sufficient brightness cannot be obtained because of the lighting conditions, the output video signal level can be increased with this selector.

The gain can be switched to three steps, 0 dB, 9 dB or 18 dB. For shooting under normal conditions, set the selector to 0 dB.

15 IRIS control (P1-21)

Adjusts the iris manually. For manual iris adjustment, set the IRIS switch on the lens to A (automatic), and the IRIS AUTO/MAN selector 16 to MAN.

When the IRIS AUTO/MAN selector is set to AUTO, fine adjustment of iris is possible within the range of half step.

16 IRIS AUTO/MAN selector (P1-21)

Selects whether the iris is adjusted automatically or manually.

AUTO: The lens iris is automatically adjusted according to the brightness of the object.

MAN: The lens iris is manually adjusted with the IRIS control 15.

This selector is activated only when the IRIS switch on the lens is set to A (automatic).

17 MODE selector (P1-18)

Selects the output video signal of the camera control unit.

CAM: The video signal picked up by the camera is output.

BARS: Color bar signal used for adjusting the monitor is output.

18 DETAIL control (P1-22)

Adjusts the contours of objects.

19 W/B (white /black) BALANCE AUTO/MAN selector (P1-20)

Selects whether the white balance and black balance are adjusted automatically or manually.

AUTO: White balance and black balance can be automatically adjusted.

MAN: White balance and black balance can be manually adjusted.

20 W/B BALANCE R/B GAIN (red and blue level of white balance adjustment) controls (P1-20)

Used for white balance adjustment. The level of the R (red) component and the B (blue) component of the signal can be adjusted. These controls are activated only when the W/B BALANCE AUTO/MAN selector 19 is set to MAN.

21 W/B BALANCE R/B PED (red and blue pedestal level of black balance adjustment) controls (P1-20)

Used for black balance adjustment. The pedestal level of the R (red) component and the B (blue) component of the signal can be adjusted. These controls are activated only when the W/B BALANCE AUTO/MAN selector 19 is set to MAN.

[22] MASTER PED (pedestal level) control (P1-22)

Adjusts the pedestal level of the R, G and B components of the output signal simultaneously.

[23] SHUTTER ON/OFF switch (P1-24)

When the electronic shutter is used, set the switch to ON; when the shutter is not used, set to OFF.

[24] SHUTTER speed selector (P1-24)

Selects the shutter speed with the SHUTTER ON/OFF switch [23] set to ON.

Seven speeds (F.L.* (flickerless; 1/120), 1/250, 1/500, 1/1000, 1/2000, 1/4000 or 1/10000 seconds) are available.

[25] SC (subcarrier) PHASE selector and control (P1-23)

To operate the camera synchronizing with the VBS or HD/VD signals, adjust the subcarrier phase difference between the external sync signal and the camera output signal.

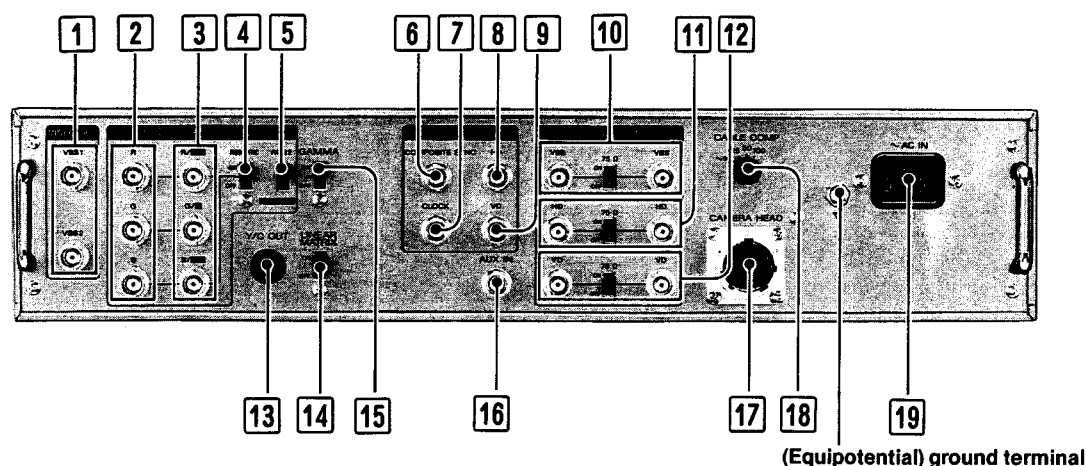
Set the selector to either 0° or 180°, then turn the control for fine adjustment.

[26] H PHASE (horizontal phase) control (P1-23)

To operate the camera with the sync system using VBS or HD/VD signal, adjust the horizontal sync phase difference between the external sync signal and the camera output signal.

* When the unit is used in the area of 60 Hz power frequencies, set the selector to F.L to avoid flickering of pictures under a fluorescent lamp.

Camera Control Unit — rear



1 VIDEO OUT connectors: VBS1, VBS2 (BNC type) (P1-14)

A picture picked up by the camera is output as the composite video signal (VBS: Video, Burst, Sync) from these connectors. The same signals are output from these connectors and the VIDEO OUT connector on the front panel. Connect to the composite video input connector on a video monitor or VTR.

2 RGB1 output connectors: R, G, B (BNC type) (P1-15)

A picture picked up by the camera is output as the R, G and B signals. Connect to the R, G and B input connectors on a monitor, VTR, computer, etc.

3 RGB2/COMPONENT output connectors: R/R-Y, G/Y, B/B-Y (BNC type) (P1-14, 1-15)

A picture picked up by the camera is output from these connectors as the R, G and B signals or the component signals (Y, R-Y, B-Y) selected by the RGB2/COMPONENT selector **5**. The R, G and B signals output here are the same signals as those output from the RGB1 connectors.

4 RGB SYNC ON/OFF switch (P1-15)

To add the sync signal to the R, G and B signals output from the RGB1 and RGB2 connectors, set the switch to ON. Not to add the signal, set the switch to OFF.

5 RGB2/COMPONENT selector (P1-14, 1-15)

Select the output signal from the RGB2/COMPONENT connectors **3**.

6 OUTPUT: COMPOSITE SYNC connector (BNC type) (P1-15)

A composite sync signal is output. To synchronize the external equipment such as a video monitor with this unit, connect to the sync input connector of the equipment.

7 OUTPUT: CLOCK connector (BNC type)

A clock signal (14 MHz) synchronized with the CCD driving clock is output. Connect to the clock input connector on a computer which can be synchronized with an external clock and terminate the clock signal in 75 ohms. Then the computer can be operated synchronizing with the clock of this unit. Connect this connector when a picture picked up by the camera is processed in the unit of a picture element.

8 OUTPUT: HD connector (BNC type)

To synchronize the external equipment with this unit in the sync system using the HD/VD signal, connect to the HD signal input connector of the equipment.

9 OUTPUT: VD connector (BNC type)

To synchronize the external equipment with this unit in the sync system using the HD/VD signal, connect to the VD signal input connector of the equipment.

10 GENLOCK IN: VBS connectors (BNC type) and 75-ohm termination switch (P1-16)

To operate this unit in an external sync system using the VBS signal, input the reference sync signal (VBS or black burst) to one of these connectors.

The input reference sync signal is directly output from the other connector. When the output signal is supplied to other equipment, set the 75-ohm termination switch to OFF. When the output signal is not used, set the switch to ON.

[11] GENLOCK IN: HD connectors (BNC type) and 75-ohm termination switch (P1-17)

To operate this unit in an external sync system using the HD/VD signals, input the HD signal to one of these connectors.

The input HD signal is directly output from the other connector. When the output signal is supplied to other equipment, set the 75-ohm termination switch to OFF. When the output signal is not used, set the switch to ON.

[12] GENLOCK IN: VD connectors (BNC type) and 75-ohm termination switch (P1-17)

To operate this unit in an external sync system using the HD/VD signals, input the VD signal to one of these connectors.

The input VD signal is directly output from the other connector. When the output signal is supplied to other equipment, set the 75-ohm termination switch to OFF. When the output signal is not used, set the switch to ON.

[13] Y/C OUT connector (mini DIN 4-pin) (P1-15)

A picture picked up by the camera is output as the Y/C signal (luminance signal/chrominance signal). Connect to the Y/C signal input connector on a video monitor or VTR of ED Beta* format or S-VHS** format.

[14] LINEAR MATRIX ON/OFF switch (P1-24)

The linear matrix circuit (which reproduces life-like color with the matrix processing) is turned ON and OFF. Normally set to ON. If the signal without linear matrix processing is required for a picture processing, set the switch to OFF.

[15] GAMMA ON/OFF switch (P1-23)

Gamma correction circuit (which compensates the luminance characteristics of the cathode ray tube by increasing the output level of the input signal with lower luminance) is turned ON and OFF.

ON: Gamma value is set to 0.45. Normally set to this position.

OFF: Gamma value is set to 1 (no gamma correction). When a picture without gamma correction is required, set to this position.

[16] AUX IN connector (BNC type)

Input the monochrome signal such as title, figures, made by the external equipment, and the picture is superimposed on the picture picked up by the camera. Input the signal which does not include sync signal, and adjust its level so that the level of the signal output from the camera control unit does not exceed the designated amount.

To synchronize the external equipment with this unit, connect the OUTPUT: HD connector [8]/VD connector [9] or the OUTPUT: COMPOSITE SYNC connector [6] to the corresponding input connector of the external equipment.

[17] CAMERA HEAD connector (P1-13)

Connect the cable from the camera head or an extension camera cable (optional).

[18] CABLE COMP (compensation) selector (P1-13)

Set this selector according to the length of the camera cable being used (10, 25, 50 or 100 m). The built-in cable compensator performs compensation according to the selected cable length to eliminate signal degradation.

[19] AC IN connector (P1-13)

Connect the supplied AC power cord.

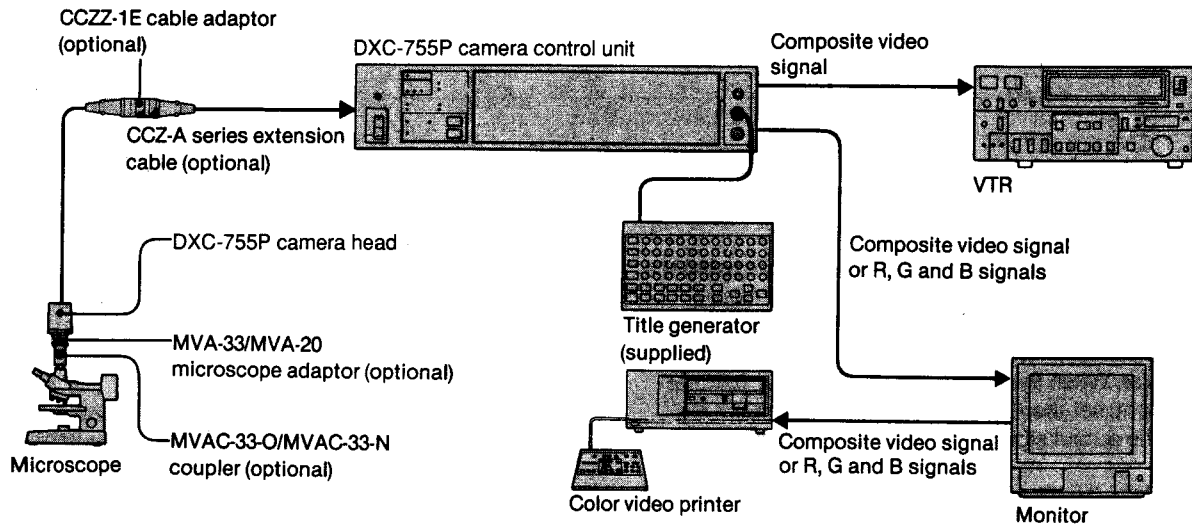
* ED Beta is a trademark of Sony Corporation.

** S-VHS is a trademark of Victor Company of Japan, Limited.

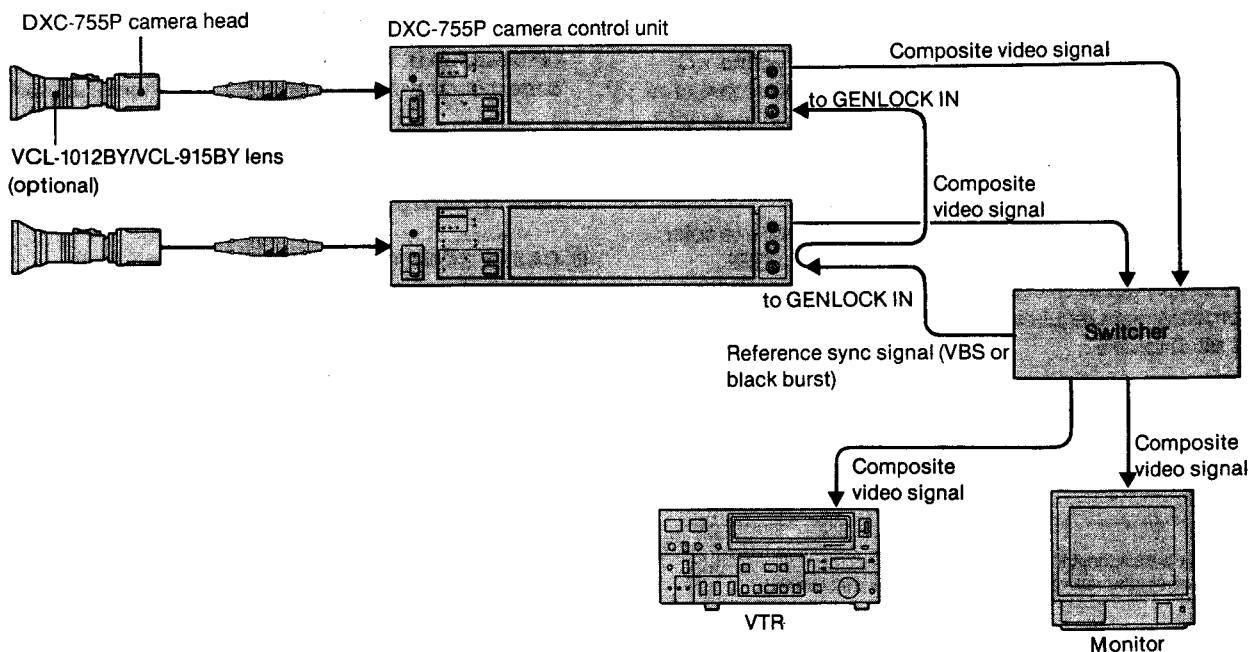
1-4. EXAMPLES OF SYSTEM CONFIGURATION

Combination with a Microscope or an Endoscope

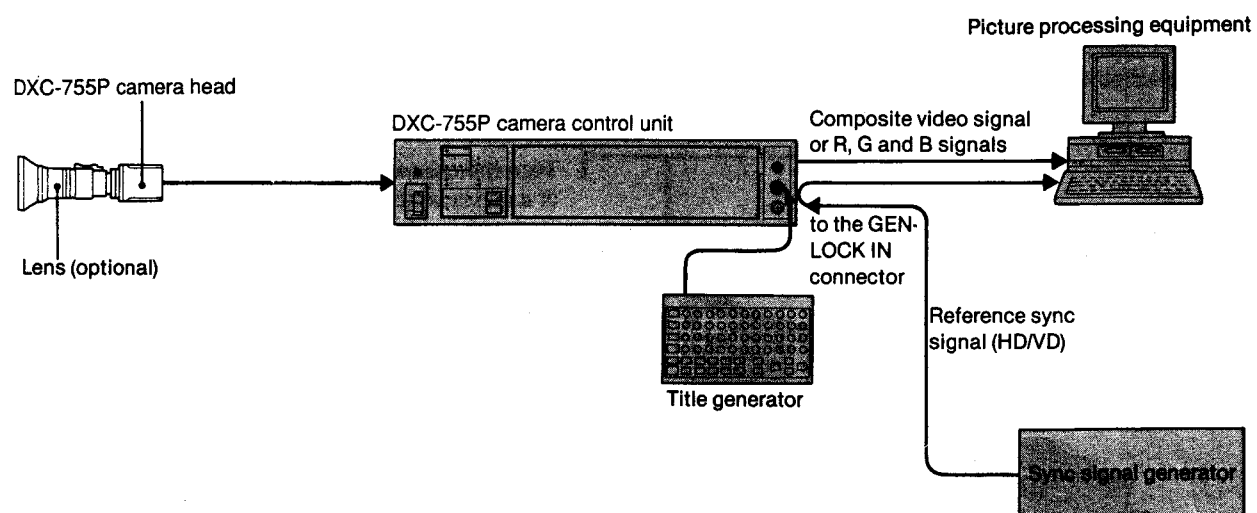
To connect a microscope, operation microscope or endoscope to the camera head, an optional adaptor is necessary (see "Specifications").



When Multiple Cameras Are Used (external sync with the VBS signal)



Combination with Picture Processing Equipment (external sync with the HD/VD signals)

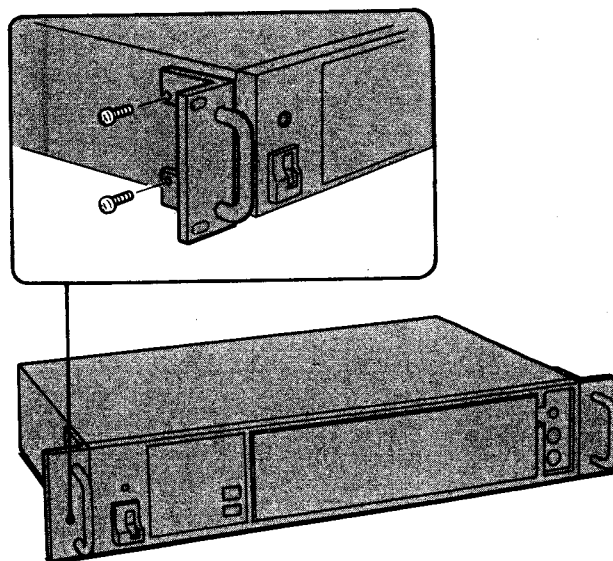


Rack Mounting

When the rack mount brackets (supplied) are attached to the control unit, the unit can be mounted in a 19-inch standard rack.

Note

Avoid mounting multiple control units stacked. Air circulation may be insufficient, and malfunction or error may occur.

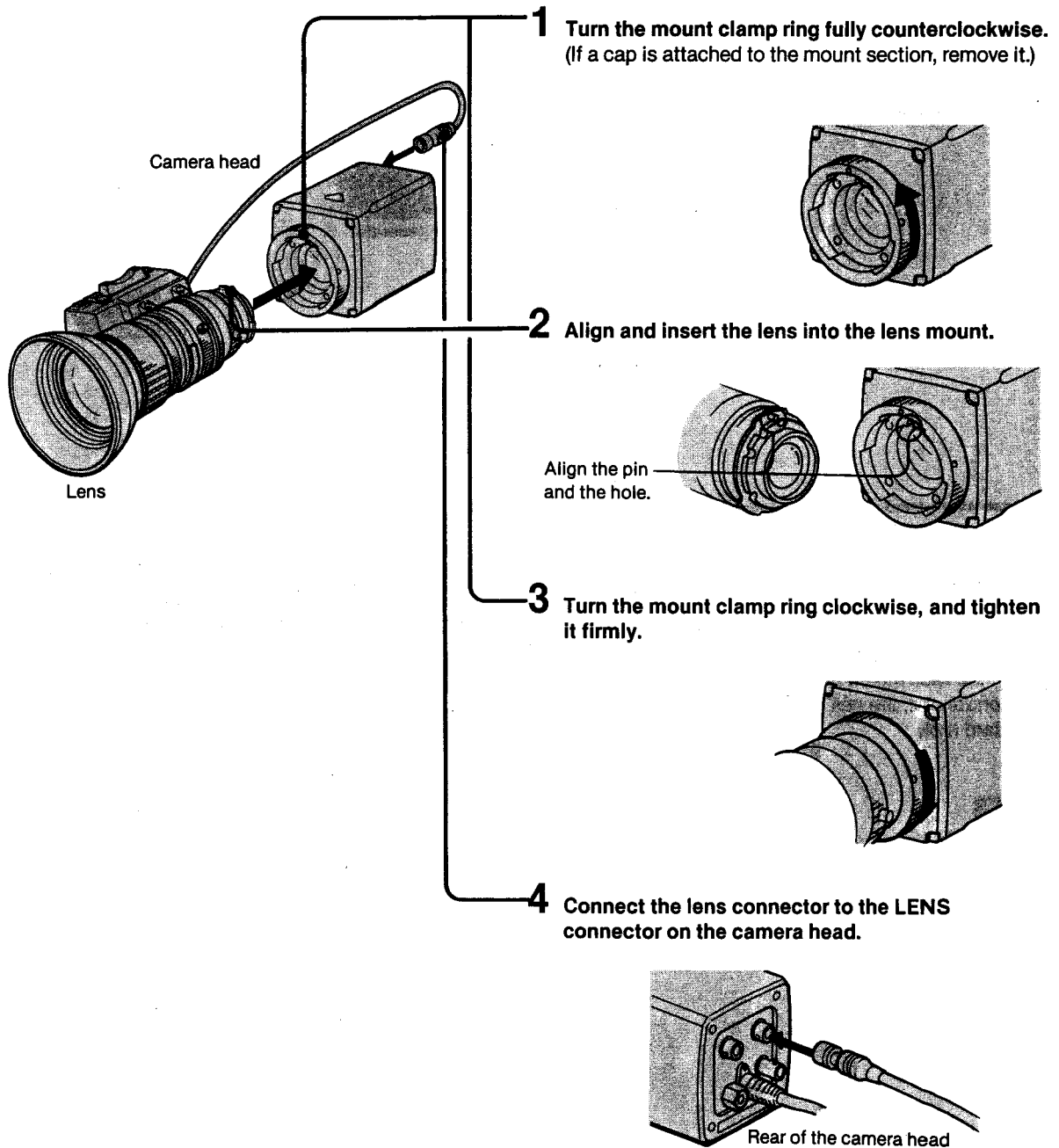


1-5. CONNECTIONS

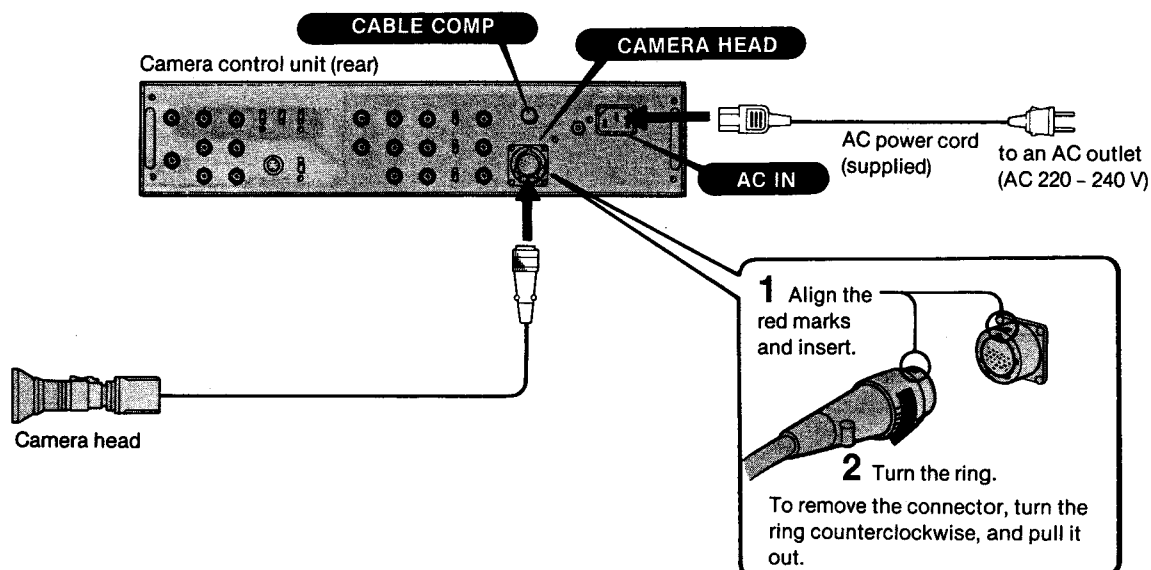
Attaching a Lens or a Microscope Adaptor

A lens with bayonet mount can be attached to the camera.

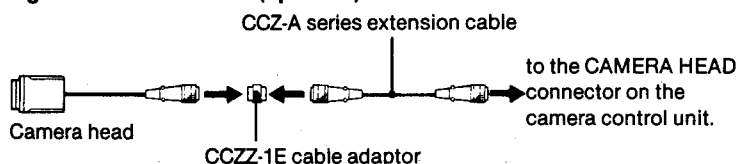
To mount a microscope, operation microscope or endoscope to the camera, an adaptor for a microscope or endoscope should be mounted to the camera head. The adaptor can be attached to the camera head with the same method as of the lens.



Connecting the Camera Head



Using an extension cable (optional)

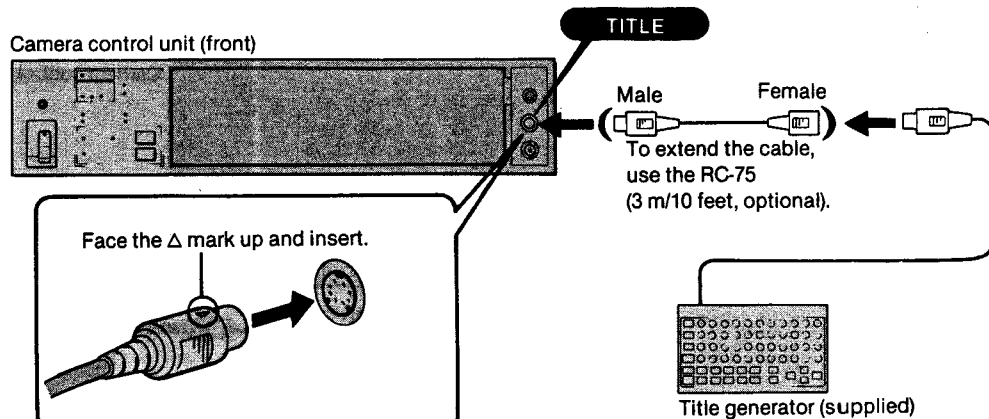


- Set the CABLE COMP selector to 10, 25, 50 or 100 m according to the total length of the used cables. The cable compensation circuit compensates the transmission loss of high-frequency components and the output level decreases.

Attaching the camera head to a tripod

The camera head can be attached to a tripod using either of the screw holes (U1/4"-20UNC) on its top and bottom.

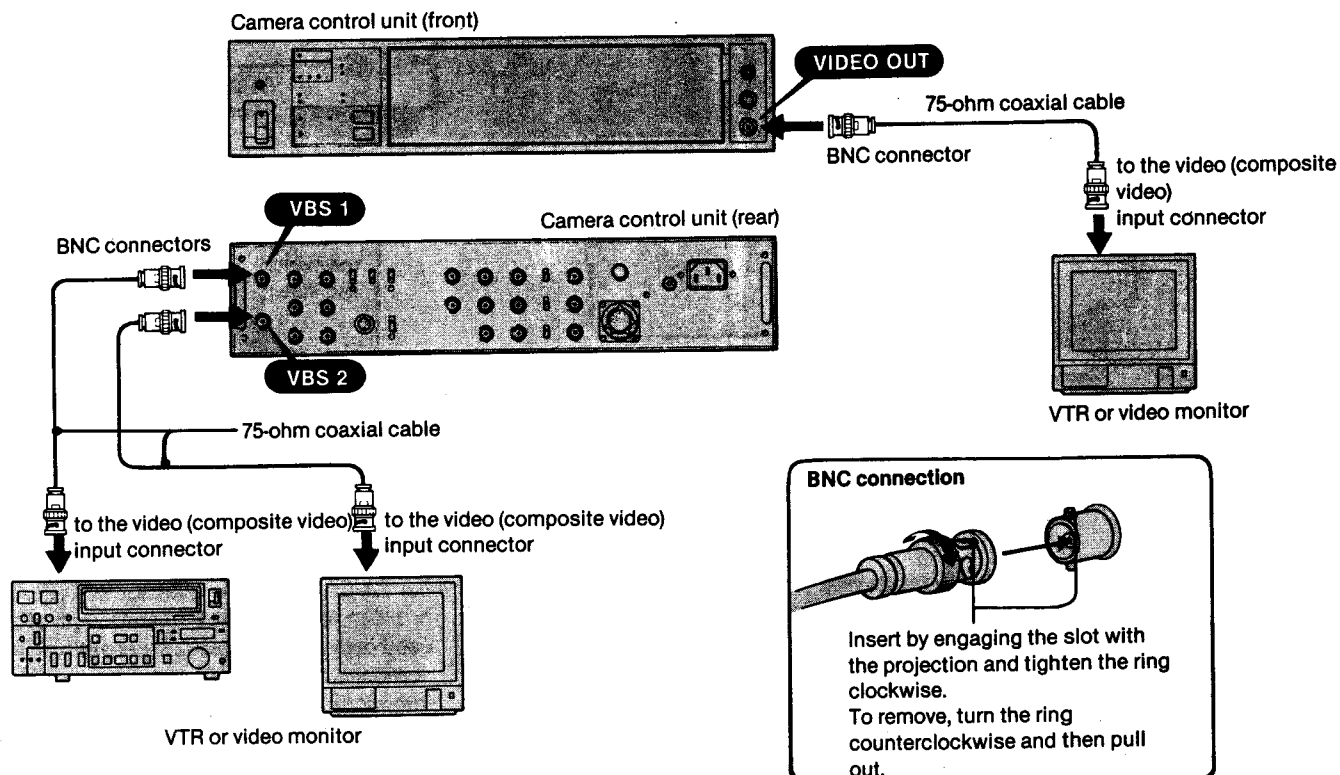
Connecting the Title Generator



Connecting a Video Monitor and a VTR

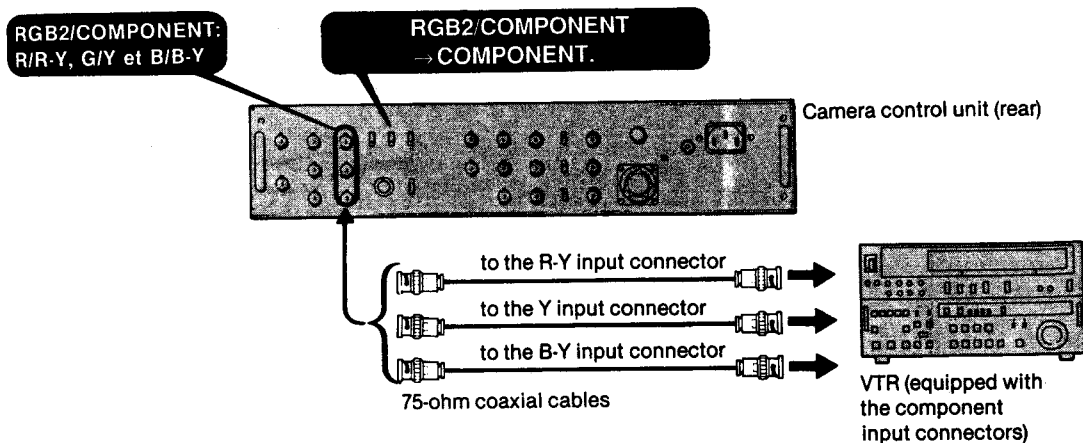
Connecting the equipment with the composite video input connector

The same composite video signals are output from the VIDEO OUT connector on the front panel and the VIDEO OUT VBS1 and VBS2 connectors on the rear panel of the camera control unit.



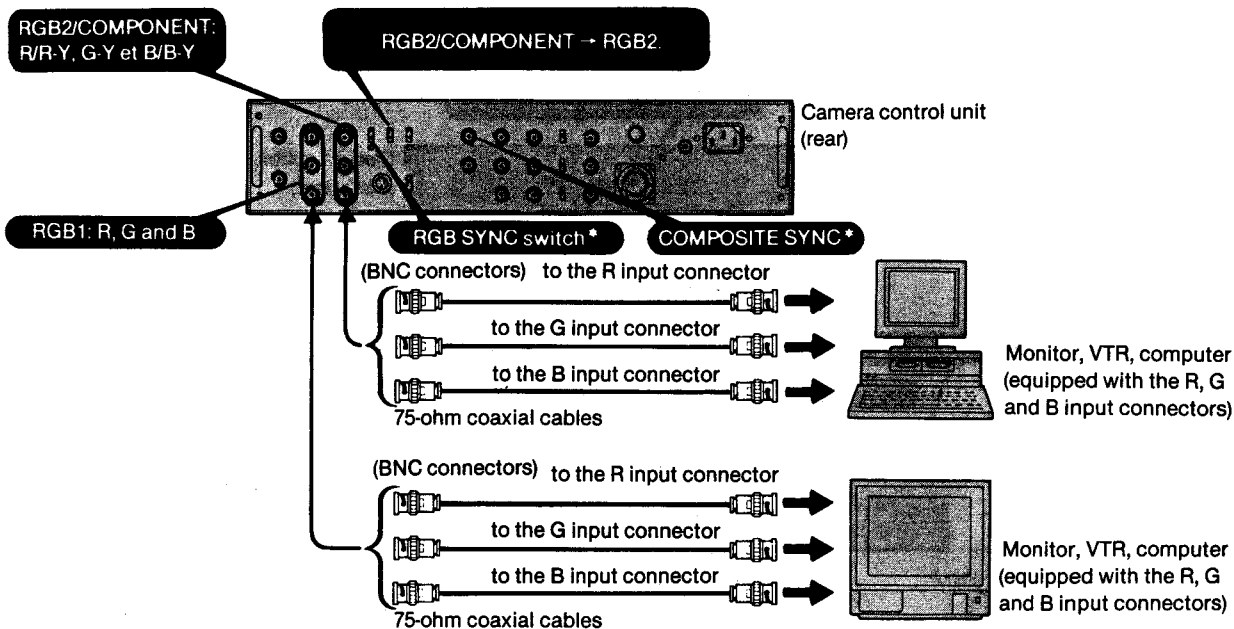
Connecting a VTR with the component input connectors

To supply the component signals from the RGB2/COMPONENT connectors, set the RGB2/COMPONENT selector to COMPONENT.



Connecting the equipment with the R, G and B input connectors

To supply the R, G and B signals from the RGB2/COMPONENT connectors, set the RGB2/COMPONENT selector to RGB2. Then the same signals are output from the RGB1 and RGB2/COMPONENT connectors.

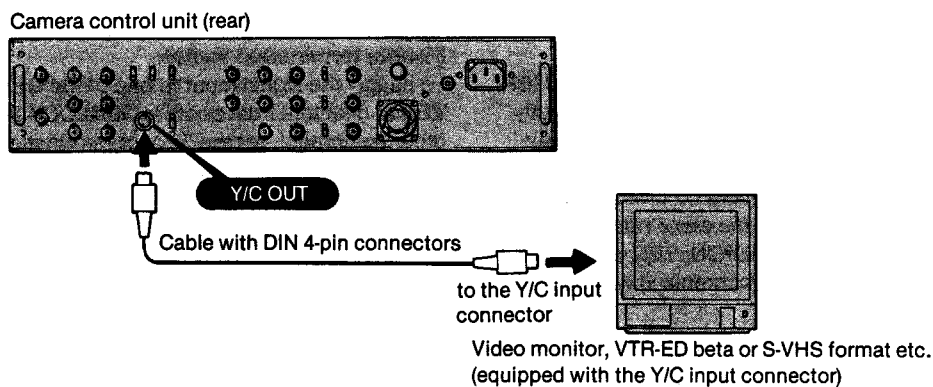


* To synchronize the RGB monitor with the camera

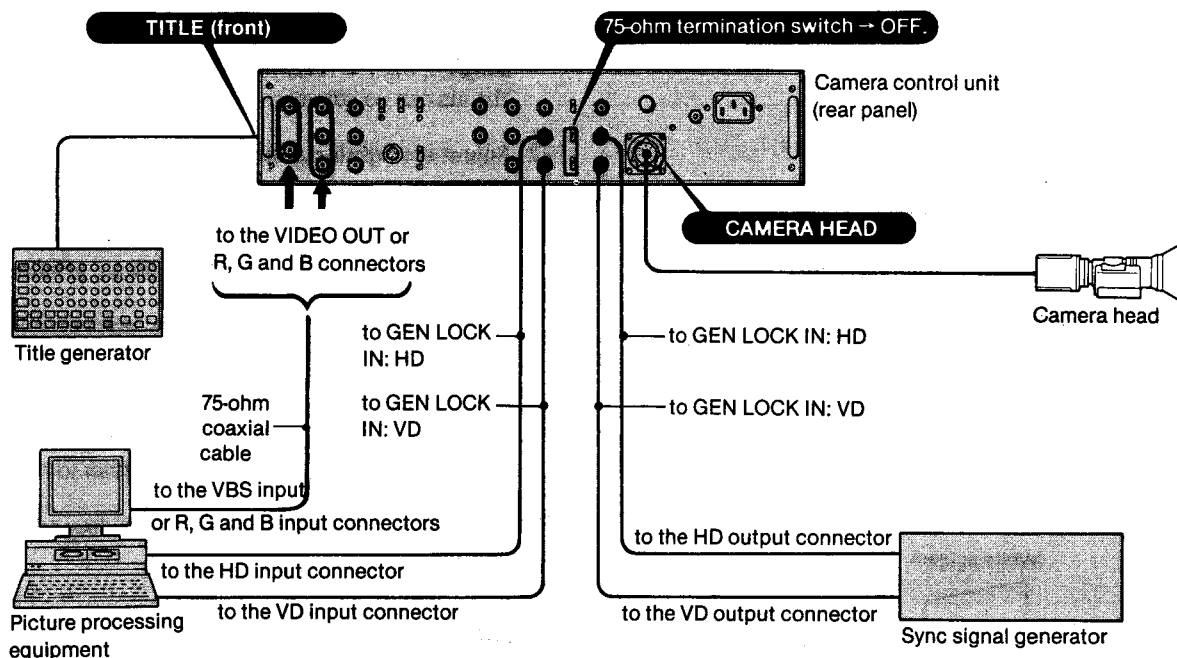
To synchronize the monitor with the composite sync signal, connect the COMPOSITE SYNC connector to the sync signal input connector on the monitor and set the RGB SYNC switch to OFF.

When using a monitor which can be synchronized with the sync signal added to the RGB signals, set the RGB SYNC switch on the camera control unit to ON. The sync signal is added to the RGB signals output from the camera. In this case, connection of the COMPOSITE SYNC connector is unnecessary.

Connecting the equipment with the Y/C input connector



Connecting the Picture Processing Equipment (external sync with the HD/VD signals)



GEN LOCK IN connector

HD and VD signals input to either of the two GNELOCK IN: HD and VD connectors on the camera control unit are directly output from the other connectors. Input the signals output from the GENLOCK IN: HD and VD connectors to the HD input and VD input connectors on another equipment, and it is synchronized with the HD/VD signals.

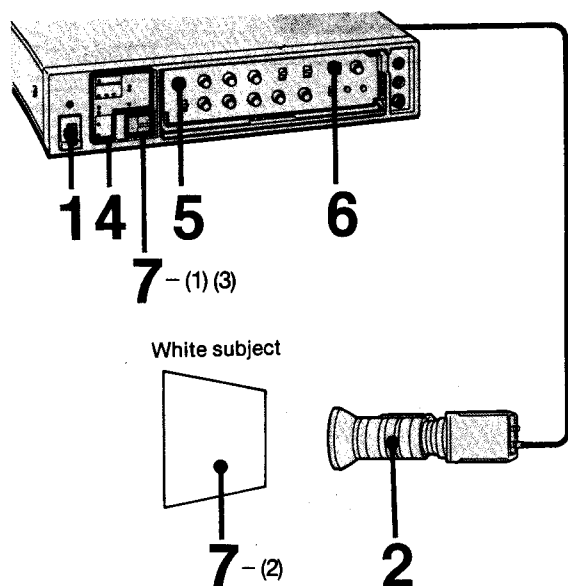
75-ohm termination switch

To supply the signal input to either of the GENLOCK IN: HD and VD connectors from the other connectors to other equipment, set the 75-ohm termination switches to OFF. Not to supply them, set the switches to ON.

1-6. BASIC OPERATION

Standard settings and basic operation for using a camera is described here.

When the camera control unit is set to the standard condition, the iris, black balance and white balance are automatically adjusted, and a good quality picture can be obtained under the normal lighting conditions without fine adjustments.



- 1** Turn on the power of the camera control unit and the equipment connected.
- 2** Set the IRIS switch on the lens (or the microscope adaptor, etc.) to A (automatic).
The iris can be adjusted with the camera control unit.
- 3** Adjust the lighting conditions and the camera angle.
- 4** Check that all the indicators on the front panel of the camera control unit are lit in green. (standard settings)
If an indicator is lit in orange, set the corresponding selector inside the cover panel to the horizontal position. The horizontal position (orange part disappears) of all switches is the standard setting position.
When the LOW LIGHT indicator is lit, refer to note 8.
- 5** Set the COLOR TEMP selector according to the lighting conditions.
Indoor shooting: 3200K
Outdoor shooting: 5600K
If lighting is too bright in case of outdoor shooting, use the supplied ND filter.
- 6** Adjust the color of the video monitor using the color bar signals as follows:
(1) Set the MODE selector to BARS.
(2) Adjust the color and hue controls on the monitor observing the color bars.
(3) After adjustment, set the MODE selector to CAM.
- 7** Adjust the black balance and white balance as follows (automatic adjustment):
(1) Press the BLACK button.
Black balance is adjusted, and the indicator lights when the adjustment is completed.
If the indicator blinks, refer to note 3.
(2) Place a white subject (white paper, cloth, etc.) near the subject to be shot actually, and display it at the center of the monitor screen.
(3) Press the WHITE button.
White balance is adjusted, and the indicator lights when the adjustment is completed. If the indicator blinks, refer to note 4.
- 8** Start shooting.

Notes

1) When multiple cameras are used

After step 4 (standard settings complete), adjust the H phase and SC phase of all the cameras. (Refer to "Adjusting the SC and H phases" on page 1-23.)

2) When the LOW LIGHT indicator is lit

The lighting is not sufficient.

Increase the brightness by using appropriate lighting, or increase the video output level. (Refer to "Adjusting the Video Output Level" on page 1-22.)

When the iris is manually adjusted, open it so that sufficient brightness is obtained before taking the above measures. (Refer to "Adjusting the Iris" on page 1-21.)

3) If the indicator blinks when the BLACK button is pressed

The automatic black balance adjustment cannot be completed. Check the followings and press the BLACK button again.

- The lens cable is properly connected to the camera head.
- Iris is closed (when the iris is manually adjusted).
- Cut off the light (when the equipment without an iris control function is connected to the camera head).

4) If the indicator blinks when the WHITE button is pressed

The automatic white balance adjustment cannot be completed. Check the followings and press the WHITE button again.

- When the LOW LIGHT indicator is lit, refer to note 2, and take the necessary measures.
- When the LOW LIGHT indicator is not lit, check if the COLOR TEMP selector is set in accordance with the lighting conditions.

5) When the lighting condition is changed

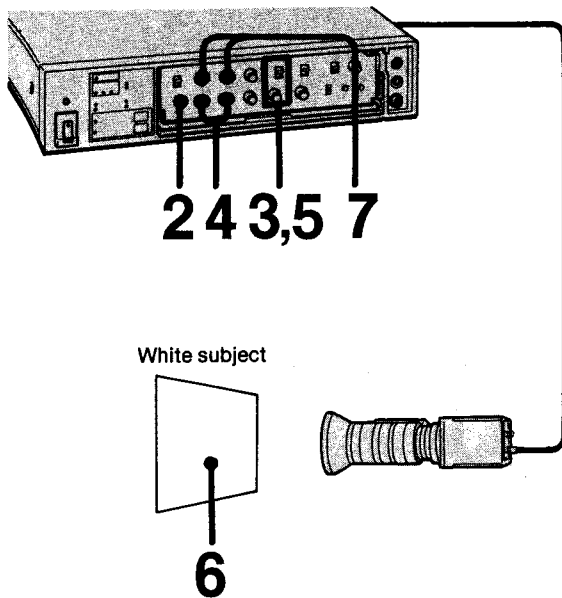
Adjust the white balance again. Black balance adjustment is not necessary. The adjusted values of white balance and black balance are kept intact for about 12 hours even when the power is turned off. Therefore readjustment is not necessary when shooting under the same lighting conditions again.

1-7. ADJUSTMENTS

Adjusting Black Balance and White Balance Manually

The black balance and white balance should be correctly adjusted to obtain lifelike color reproduction and a clear picture. Usually adjust them automatically. (Refer to "Basic Operation" on page 1-18.)

For fine adjustment, adjust them manually. For manual adjustment, use of a waveform monitor and a vectorscope is recommended.



- 1** Set the same lighting condition as that under which the shooting will be made.
- 2** Set the W/B BALANCE AUTO/MAN selector to MAN.
- 3** Set the IRIS AUTO/MAN selector to MAN, and turn the IRIS control fully counterclockwise to close the iris.
- 4** Turn the W/B BALANCE PED: R and B controls to adjust the pedestal level of R (red) and B (blue) components so that the monitor screen becomes black.
- 5** Set the IRIS AUTO/MAN selector to AUTO.
- 6** Place a white subject at the same position as the subject to be shot actually, and shoot and display it on the monitor screen.
- 7** Turn the W/B BALANCE GAIN: R and B controls to adjust the level of R (red) and B (blue) components so that the white subject on the monitor screen is pure white.

Painting

Using the GAIN and PED controls, a picture can be colored to obtain special effects.

For example, a picture can be made reddish or bluish. This is called painting.

Monitoring the picture on the color monitor screen, turn the GAIN and PED controls so that the desired color is obtained.

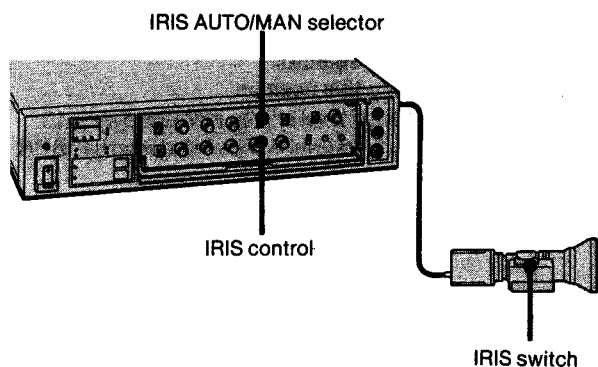
Adjusting the Iris

The iris of the lens or the microscope adaptor can be controlled by the camera control unit.

The standard setting is the automatic adjustment which obtains the optimum picture brightness.

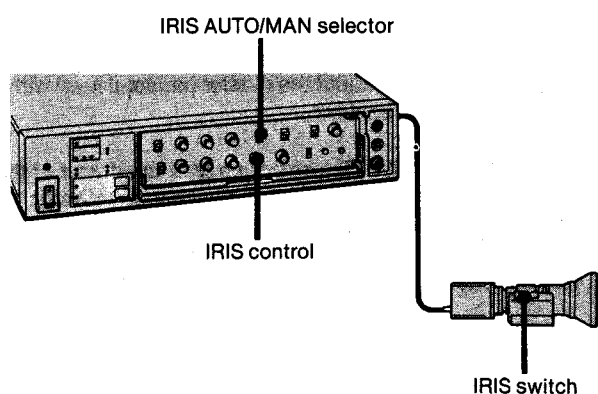
For a picture with special effects or shooting a picture with high contrast, manual adjustment is recommended for better quality picture.

Automatic adjustment



- 1** Set the IRIS selector on the lens or the microscope adaptor to A (automatic).
- 2** Set the IRIS AUTO/MAN selector on the camera control unit to AUTO
The iris will be automatically adjusted according to the brightness of the subject.
You can precisely adjust the iris within the range of half step in the automatic iris mode by turning the IRIS control.

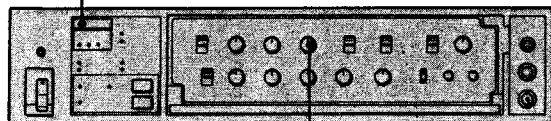
Manual adjustment



- 1** Set the IRIS switch on the lens to A (automatic).
- 2** Set the IRIS AUTO/MAN selector on the control unit to MAN.
- 3** Turn the IRIS control to adjust the iris so that the optimum brightness is obtained.

Adjusting the Video Output Level

LOW LIGHT indicator



GAIN selector

When lighting is insufficient, the LOW LIGHT indicator lights. If sufficient brightness cannot be obtained by opening the iris, the video output level is increased by the GAIN selector.

Set the GAIN selector to the appropriate position so that the optimum brightness is obtained.

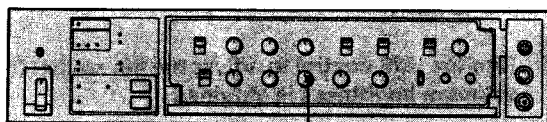
Setting of the GAIN selector

0 dB: Normally set to this position.

9 dB: The output video level will be increased by 9 dB.

18 dB: The output video level will be increased by 18 dB.

Adjusting the Master Pedestal Level



MASTER PED control

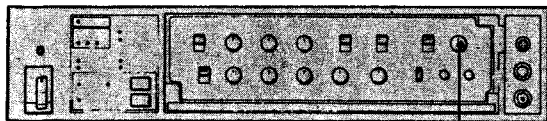
When the details of the dark parts of a picture cannot be reproduced clearly, adjust the master pedestal level with the MASTER PED control.

Turn the MASTER PED control so that the detail of the dark part such as black hairs is reproduced clearly.

When a waveform monitor is used, you can adjust the level easily.

Normally set the control to the center position.

Adjusting the Details



DETAIL control

The contours of a picture can be changed by the DETAIL control. Turn the control clockwise, and the contours will become clearer.

Adjust the contours from soft to clear as desired.

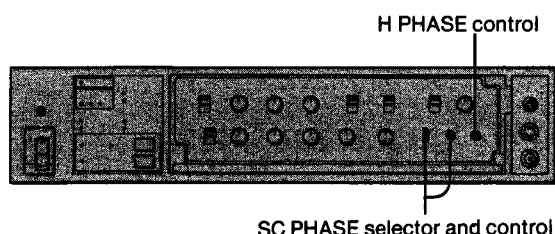
Normally set the control to the center position.

Adjusting the SC and H Phases

When two or more cameras are used, all cameras should be adjusted so that the picture tone of all cameras will be the same. Supply the same reference signal to all the cameras, and proceed as follows. (Refer to "Connecting Multiple Cameras" on page 1-16.)

If the phase check indication is available

If the cameras are connected to a special effects generator or a chroma keyer which has the phase check indication, adjust the SC and H phases as follows.



- 1** Set the PHASE INDICATION switch of the connected special effects generator or the chroma keyer to ON.
- 2** Adjust the H (horizontal) phase by turning the H PHASE control.
- 3** Adjust the SC (subcarrier) phase. Set the SC PHASE selector to 0° or 180° for coarse adjustment, and turn the SC PHASE control for fine adjustment.

For details, refer to the instruction manual of the special effects generator or chroma keyer.

If the phase check indication is not available

Pick one camera as the reference camera and adjust all other cameras to it.

Adjusting the H phase

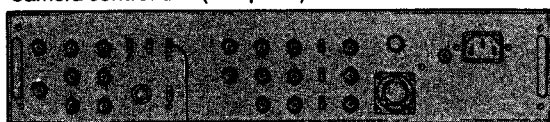
Adjust the horizontal sync signal of the output signal by turning the H PHASE control so that the phase of the reference signal and output signal become the same. Use of a waveform monitor or an oscilloscope is recommended for easier adjustment.

Adjusting the SC phase

Adjust the subcarrier phase of the output signal with the SC PHASE selector and control so that the phases of the reference signal and output signal become the same. It is recommended to use a vectorscope, or to display the same pictures on the upper and lower (or right and left) halves of the video monitor screen by using the wipe function of the special effects generator for easier adjustment.

Gamma Correction

Camera control unit (rear panel)



GAMMA ON/OFF switch

To obtain lifelike color reproduction of the dark parts of the picture by compensating the luminance characteristics of the cathode ray tube against the input signal level, the input signal from the camera head is compensated (gamma correction).

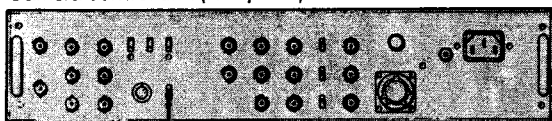
Normally set the GAMMA ON/OFF switch to ON.

A gamma value of 0.45 is obtained from the camera head output signal.

If a signal with no gamma correction is required, set the GAMMA ON/OFF switch to OFF, and the gamma value will be 1.

Linear Matrix Processing

Camera control unit (rear panel)



LINEAR MATRIX ON/OFF switch

To obtain optimum color reproduction, matrix processing of color signals is executed (linear matrix). **Normally set the LINEAR MATRIX ON/OFF switch to ON**, and the linear matrix processing will be executed.

If a signal with no linear matrix processing is required, set the LINEAR MATRIX ON/OFF switch to OFF.

Setting the Knee Characteristic

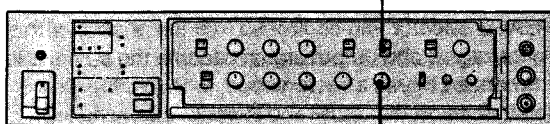
To suit the shooting condition, the unit provides two knee positions.

NORMAL position: To shoot under normal conditions or to process the picture with a computer.

LOW position: To shoot a dark object and a bright object simultaneously.

Selecting the Shutter Speed

SHUTTER ON/OFF switch



SHUTTER speed selector

To obtain a clear image of a subject moving at high speed, to obtain a strobe effect, or to reproduce a still picture, slow motion clearly, etc., use the electronic shutter.

Normally set the SHUTTER ON/OFF switch to OFF (standard setting).

To use the electronic shutter, set the SHUTTER ON/OFF switch to ON, then select the appropriate shutter speed with the SHUTTER speed selector.

Seven speeds of F.L (1/120), 1/250, 1/500, 1/1000, 1/2000, 1/4000 and 1/10000 seconds are available.

1-8. SPECIFICATIONS

Image device	Interline-transfer CCD, 3-chip
Picture elements	786 × 581 (h/v)
Sensing area	8.8 mm × 6.6 mm (equivalent to a 2/3-inch pickup tube)
Sync system	Internal External (VBS, HD/VD)
Signal system	CCIR standards, PAL color system
Scanning system	625 lines, 2:1 interlace
Scanning frequency	Horizontal: 15.625 kHz Vertical: 50 Hz
Horizontal resolution	750 lines (center)
Sensitivity	2,000 lux with F7, at 3200K (typical)
Minimum illumination	13 lux with F1.4, +18 dB
Signal-to-noise ratio	58 dB (typical)
Lens mount	Bayonet mount
Shutter speed	1/120 (flickerless), 1/250, 1/500, 1/1000, 1/2000, 1/4000 and 1/10000 second
Camera cable extension	100 m in maximum
Video output	0 dB, 9 dB, 18 dB
Detail compensation	Manual
Linear matrix	ON/OFF
Gamma	1 or 0.45 (selectable)
Knee characteristic	NORMAL/LOW (selectable with internal switch)
Black balance and white balance adjustment	Automatic Manual: R and B (gain and pedestal)
Input and output connectors	Camera head LENS (6-pin) ×1 MONITOR (BNC-type) ×1 CONTROL (4-pin) ×1 Ground ×1 Camera control unit VIDEO OUT (on the front) (BNC-type) ×1 VBS 1.0 Vp-p, 75 ohms VIDEO OUT: VBS1, 2 (on the rear) (BNC-type) ×1 in each VBS 1.0 Vp-p, 75 ohms RGB1: R, G, B (BNC-type) ×1 in each 0.7 Vp-p, 75 ohms RGB2/COMPONENT (selectable) R/R-Y, G/Y, B/B-Y (BNC-type) ×1 in each R, G, B 0.7 Vp-p, 75 ohms R-Y 0.525 Vp-p Y 1.0 Vp-p B-Y 0.525 Vp-p } 75 ohms Y/C OUT (mini DIN 4-pin) ×1 1.0 Vp-p, 75 ohms OUTPUT: COMPOSITE SYNC (BNC-type) ×1 4 Vp-p, 75 ohms HD, VD (BNC-type) ×1 in each 4 Vp-p, 75 ohms CLOCK (BNC-type) ×1 2 Vp-p, 75 ohms

GENLOCK IN:
VBS (BNC-type) ×2
VBS (1.0 Vp-p) or black burst (0.3 Vp-p), loop-through, with 75-ohm termination switch
HD, VD (BNC-type) ×2 in each
4 Vp-p, loop-through, with 75-ohm termination switch
CONTROL IN (4-pin) ×1
AUX IN (BNC-type) ×1
TITLE (8-pin) ×1
Ground ×1
AC IN ×1

Power requirements
220 to 240 V AC, 50/60 Hz
Current consumption
0.25 A
Storage temperature
-20°C to +60°C (-4°F to +140°F)
Operating temperature
-5°C to +45°C (23°F to 113°F)
Dimensions and weight
Camera head
Dimensions: 70 × 75 × 113.5 mm (w/h/d)
(17/8 × 3 × 4 1/2 inches)
not including projecting parts
Weight: 600 g (1 lb 5 oz)
not including the cable
Camera control unit
Dimensions: 424 × 88 × 283 mm (w/h/d)
(16 3/4 × 3 1/2 × 11 1/4 inches)
not including projecting parts
Weight: 6.5 kg (14 lb 5 oz)

Accessories supplied
Title generator (1)
AC power cord (1)
ND filter (1)
Rack mount brackets (2)
Screws (4)

Design and specifications subject to change without notice.

Optional accessories

Zoom lens: VCL-1012BY (x12)
VCL-915BY (x15)
Microscope adaptor: MVA-33, MVA-20 (with automatic lighting adjustment function)
Coupler: MVAC-33-O (for Olympus VANOX, BH-2 series microscope)
MVAC-33-N (for Nikon V series, X/Y series microscope)
Microscope adaptor: MVA-365 (one-way type)
MVA-385 (two-way type)
Camera cable: CCZ-A series cable (2 to 100 m)
CCZ-A camera cable adaptor: CCZZ-1E, CCZZ-1B (installable on a wall)
Extension cable for the title generator: RC-75 (3 m)
IR cut filter for medical use

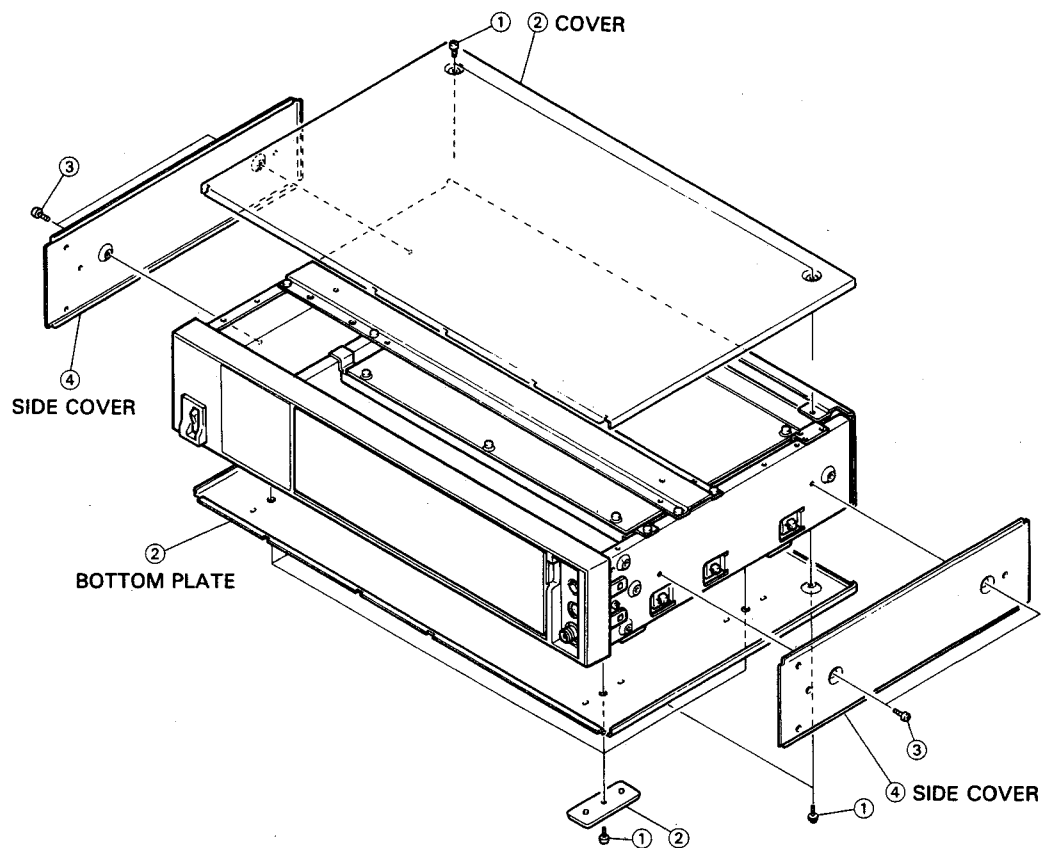
CHAPTER 2

SERVICE INFORMATION

2-1. REMOVAL

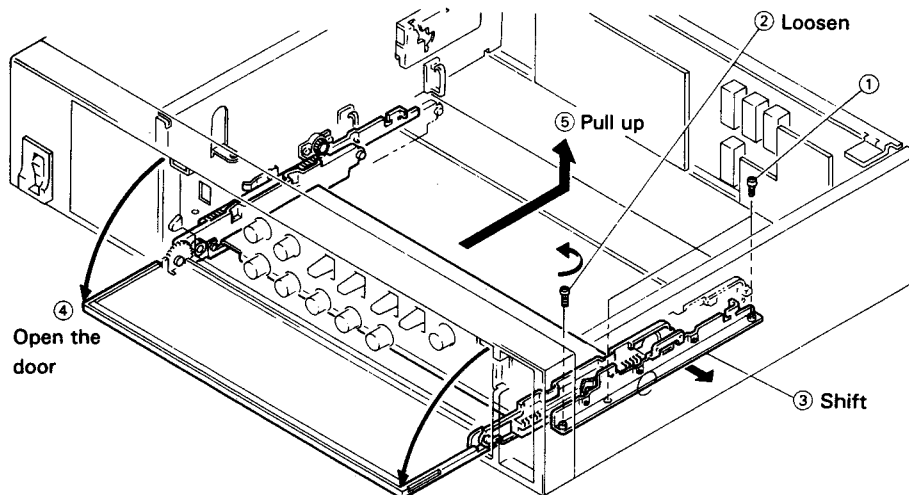
2-1-1. Removal of Cover

- ① Remove the two screws on the cover and remove the six screws on the bottom plate.
- ② Remove the cover and bottom plate.
- ③ Remove the four screws on the side cover.
- ④ Remove the side cover.



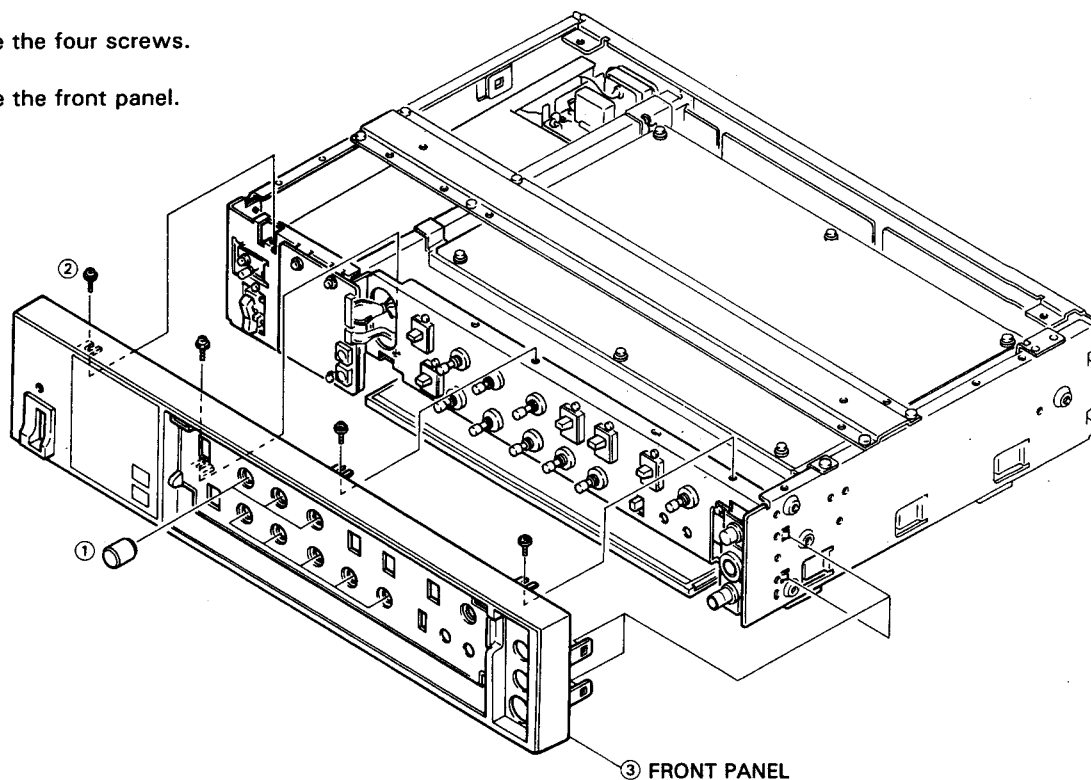
2-1-2. Removal of Front Door

- ① Remove the two screws.
- ② Loosen a screw.
- ③ Shift the slide guide.
- ④ Open the door.
- ⑤ Pull up the front door.



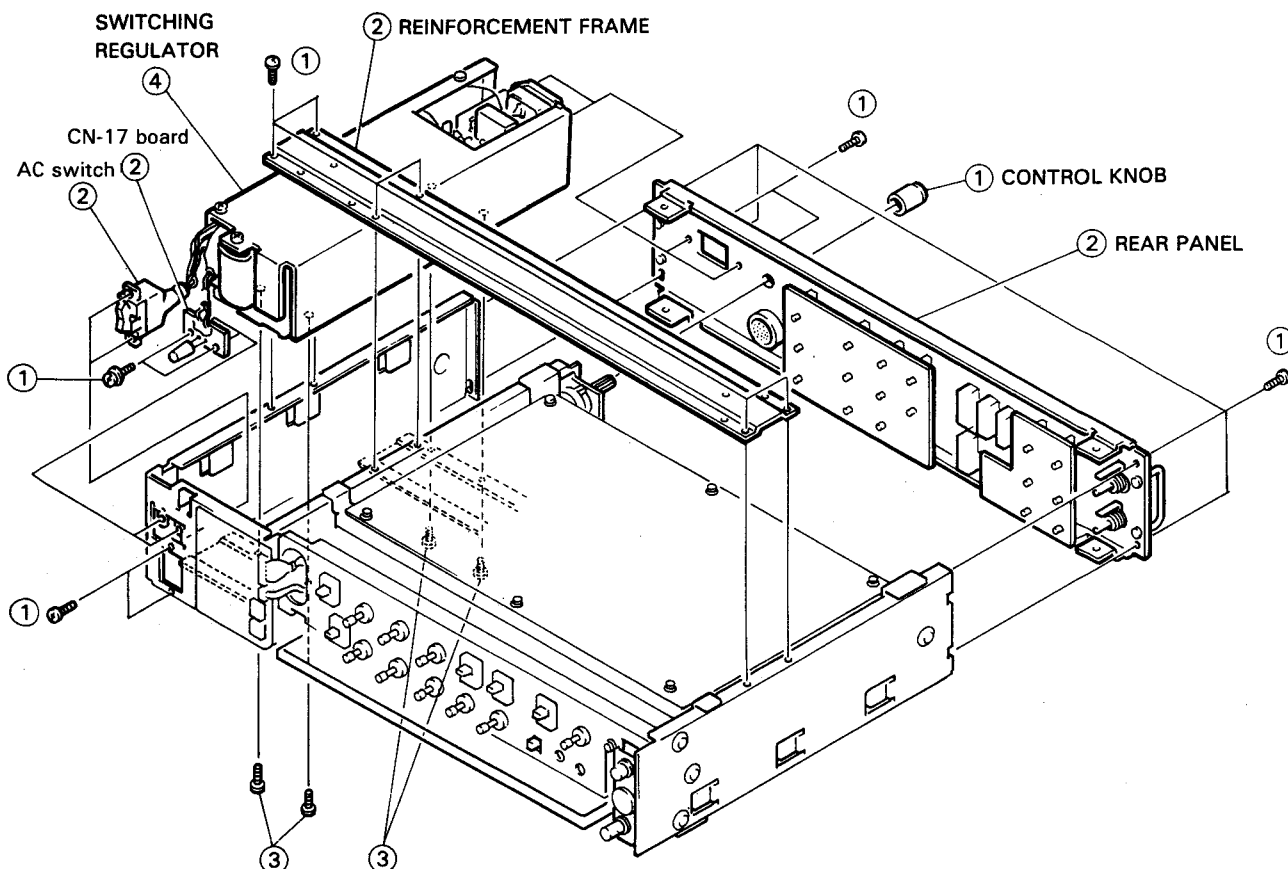
2-1-3. Removal of Front Panel

- 1 Remove the nine control knobs.
- 2 Remove the four screws.
- 3 Remove the front panel.



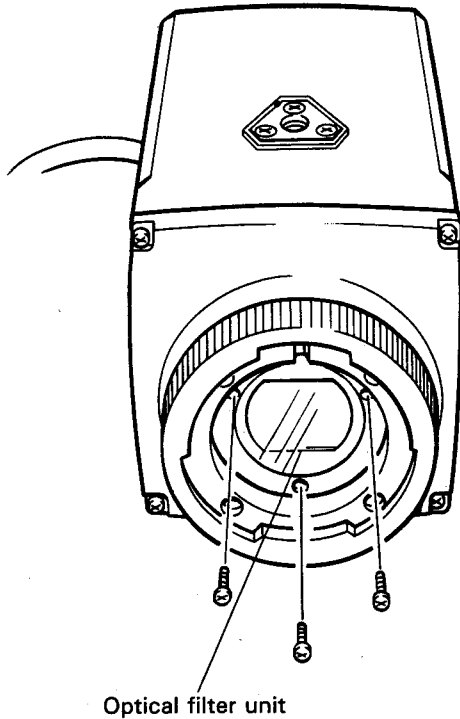
2-1-4. Removal of Switching Regulator

- ① Remove the 16 screws and remove the control knob on the rear panel.
- ② Remove the rear panel, reinforcement frame, AC switch, and CN-17 board.
- ③ Remove the four screws on the switching regulator.
- ④ Remove the switching regulator.



2-2. REPLACEMENT OF FILTER UNIT

Remove the three screws and remove the optical filter unit.



2-3. NOTE ON REPLACING CAMERA HEAD UNIT

After replacing the following camera head unit with a new one, adjustment with the camera control unit is required. Refer to Chapter 4 ALIGNMENT, 4-6-5. Resolution Adjustment.

(CAMERA HEAD UNIT)

Part No.

A-7575-175-A (for DXC-755)

A-7575-176-A (for DXC-755P)

A-7575-177-A (for DXC-760MD)

(Spare Filter)

Part No.

1-547-312-11

Description

FRONT FILTER UNIT

(for DXC-755/755P)

1-547-311-11

FRONT FILTER UNIT (MD)

(for DXC-760MD)

1-547-310-11

FRONT FILTER UNIT (ND)

(supplied)

NOTE: When the MD filter is to be used, then, turn ON the switch S1 on the PR-162N/162P board (see page 4-3).

CHAPTER 3

THEORY OF OPERATIONS

3-1. PR-162 board

The PR-162 board is composed of three blocks, a process circuit, automatic circuit and mix circuit.

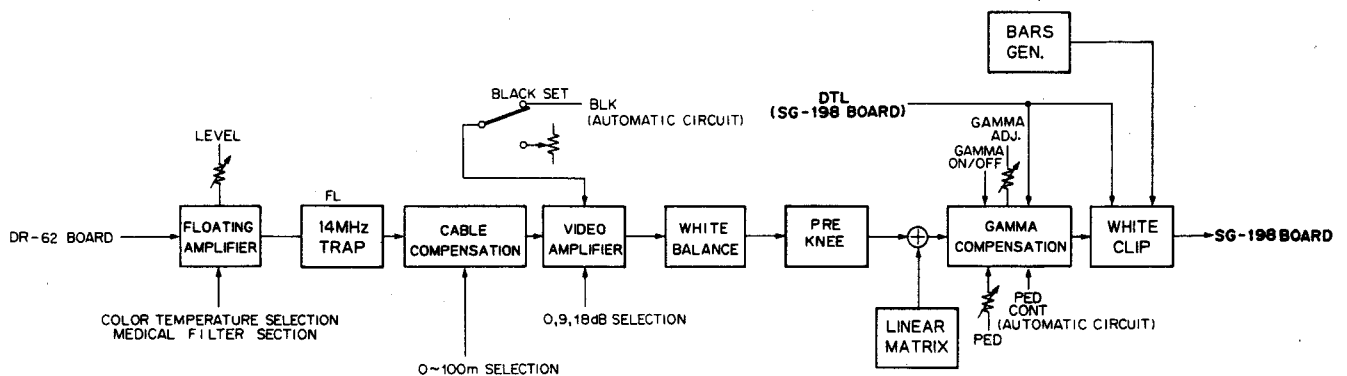
<Process circuit>

(1) Basic composition

The process circuit accepts the R, G and B signals sent from the driver circuit DR-62 board in the camera head, and outputs to the encoder after processing the signals as follows. It also contains the color bar generation circuit.

- Floating amplifier, color temperature selection circuit
- Cable compensation circuit
- Video amplifier gain selection circuit
- Black set
- White balance
- Pre-knee circuit
- Linear matrix circuit
- Gamma compensation
- Pedestal
- White and black clip circuit
- Color bar generation circuit

(2) Block diagram (R channel)



(3) Circuit description

As the circuits of the R, G and B channels are the same, only the G channel is described, and only the different points are explained on the R and B channels.

1) Floating amplifier and color temperature selection circuit

A video signal of 300 mV p-p (100% input) to both ends of the R111 75-ohm termination resistor from the DR-62 board in the camera head using a 75-ohm coaxial cable, passes the floating amplifier, which is composed of Q40 through Q44 to cancel the hum picked up by the cable. Then the 14 MHz clock component which is leaked into the signal in the camera head is reduced by the FL2 14 MHz trap filter. The RV1 adjusts the video amplifier output at TP6 so that it will be 200 mV p-p.

In the R and B channels, electrical color temperature selection is performed by Q4 and Q82. (Refer to Table 1.)

In the R channel, S1 is also provided to reduce the sensitivity when a medical filter is attached.

Table 1

	Q4	Q82
3200°K	ON	OFF
5600°K	OFF	ON

2) Cable compensation circuit

A signal of 300 mV p-p input to Q51 is reversed by the Q51 grounded emitter amplifier, and sent to the Q58 buffer. The signal from the emitter of Q51 passes one of Q52 through Q55, and is buffered by Q56. Then the high frequency component is increased and reversed by Q57, and the signal is sent to the Q58 buffer.

Cable length, 0, 25, 50 or 100 m, is selected by Q52 through Q55, and the amount of compensation is determined by the resistive dividing ratio of R141 through R145. (Refer to Table 2).

Table 2

	Q52	Q53	Q54	Q55
0 m	OFF	OFF	OFF	ON
25 m	OFF	OFF	ON	OFF
50 m	OFF	ON	OFF	OFF
100 m	ON	OFF	OFF	OFF

3) Video amplifier gain selection

The video amplifier gain selection circuit is composed of the video amplifier of Q63 through Q67, gain selector by feedback loop of Q61 and Q62 (refer to Table 3), and DC level fixed circuit of IC6 and Q58. The signal of 300 mV p-p input from the Q59 buffer becomes 200 mV p-p at TP2 when the gain is 0 dB, and the DC is clamped to 0.6 to 0.7 V.

Table 3

	Q61	Q62
0 dB	ON	ON
9 dB	ON	OFF
18 dB	OFF	OFF

4) Black set

Black set is performed by switching the black set control voltage (BLK) and the voltage of the black set variable resistor (BLK SET) by IC12. For switching, an H SAMPLE pulse supplied from the SG-198 board is used. The output voltage shown in Figure 1 is added to the feedback signal of the clamp of the gain-up amplifier (Q63 emitter), and the pedestal level is adjusted by RV5 G BLK SET so that it does not change at 0, 9 and 18 dB by the output of the process circuit.

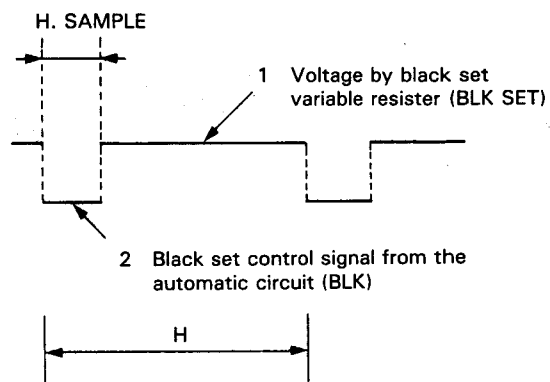


Figure 1 Black set

5) White balance cleaning circuit

The signal of 200 mV (0 dB), which is output from the video amplifier circuit, passes the cleaning circuit of IC19 and IC20 for cleaning the damage caused by the Q68 clamp and the unnecessary signal output from CCD. The voltage sampled at pin 3 of IC6 passes the IC20 voltage follower, and only the signal in the pre-blanking period is replaced with the video signal by IC19. The pre-blanking signal (PRE BLKG) is input from the SG-198 board. The signal of 200 mV p-p input to IC7 is amplified by 2.5 times, and the signal of 500 mV p-p is output from pin 12. The voltage of the G channel at pins 8 and 10 is fixed to 2.5 V. IC7 is originally used for a balanced modulator, but it is used as a gain amplifier in this circuit. The voltage of the R and B channels at pins 8 and 10 is adjusted so that it matches that of the G channel by RV7 and RV9 variable resistors which set the pre-set conditions. In automatic white balance adjustment, the white balance control voltage (0 - 5 V DC) supplied from the automatic circuit is added to the R and B channels to control the white balance with the G channel. The manual white balance adjustment is also possible by the manual control voltage supplied from the automatic circuit.

6) Pre-knee circuit

The pre-knee circuit is a compression circuit of extremely bright light input so that the dynamic range is secured in the later stage. This camera has two pre-knee circuits; one is in the NORMAL mode and the other is in the LOW mode. They are selected by the switch S2.

In the NORMAL mode, the circuit consisting of Q72, D12 and RV8 is active. When the base voltage of Q72 becomes higher than the voltage determined by RV8 etc., D12 conducts, and the compression begins.

In the LOW mode, the circuit consisting of Q142, D44 and RV36 operates in the same way as in the NORMAL mode. They differ in both the point where the compression begins and the compression ratio.

This circuit compresses the signal from 103 to 500%. (Refer to Figure 2.)

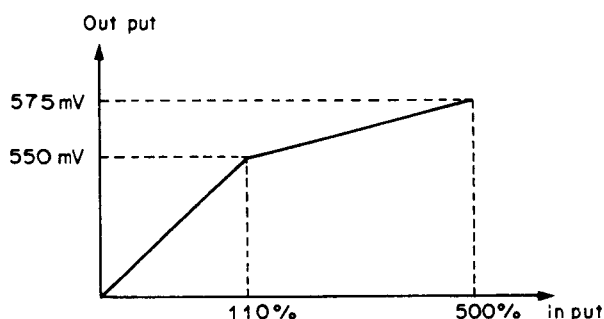


Figure 2 Pre-knee characteristics

7) Delay line, grounded base amplifier

In the R channel, a signal of 500 mV p-p passes the buffers Q34, Q144 and Q145 and the LPF of R820 and C159 is delayed by 130 ns by DL1, and is amplified to 650 mV p-p by the Q36 grounded base amplifier. The delay of 130 ns is to make the phase of the signal agree with that of the DTL signal supplied from the IE circuit.

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8) Linear matrix

The linear matrix is a circuit used to obtain life-like color as much as possible by compensating the negative hue indicated by the slanted lines in Figure 3. The input and output are as shown below.

Ro, Go, Bo: Output

Ri, Gi, Bi: Input

$$R_o = a(R_i - G_i) + b(R_i - B_i)$$

$$G_o = c(G_i - R_i) + d(G_i - B_i)$$

$$B_o = e(B_i - R_i) + f(B_i - G_i)$$

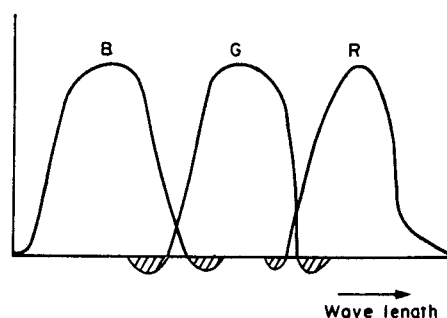


Figure 3

The signals input to the base of Q118 and Q119 from the R and G channels respectively pass the differential amplifier composed of Q118, 119 and 120, and $a(R - G)$, $c(G - R)$ are obtained after passing through the buffer. $b(R - B)$, $e(B - R)$, $d(G - B)$ and $f(B - G)$ are obtained in the same way, and they are mixed to the R, G and B channels as shown in the equations above.

9) Gamma compensation circuit

In the R channel, a signal of 650 mV p-p, which is output from the Q37 buffer becomes 600 mV p-p at pin 16 of IC3 as a result of resistive dividing by R105, R360 and R371. It is mixed with the DETAIL signal input to pin 13 of IC3 from the SG-198 board in the differential amplifier in IC3, and the gamma is compensated. The gamma compensated signal is output from pin 10 of IC3, and mixed with the linear signal output from pin 6 in RV23, and the gamma is decided. Q38 and Q39 are the gamma ON/OFF switches. When Q38 is ON and Q39 is OFF, the amount of gamma compensation can be varied by RV23. When Q38 is OFF and Q39 is ON, the gamma compensation is set to OFF, and the linear signal is output. When the gamma compensation is set to ON, the amount of gamma compensation determined by RV23 is fed back to the differential amplifier in IC3 through pin 12 of IC3, and the amplifier functions as a non-linear amplifier with gamma characteristics.

The RV24 GAMMA BAL is adjusted so that the 100% video level point does not change according to the gamma of RV23, and the gamma is adjusted by RV23 so that the cross point of the gray scale becomes 55 IRE (gamma = 0.45).

10) Pedestal

In the R channel, CLP3 sent from the SG-198 board is input to pin 5 of IC3, and the main-line signal with the gamma compensated is sampled by the period of 1H by the pedestal sample hold circuit in IC3. The sampled DC voltage is compared with the pedestal control voltage (0 – 5 V DC) supplied from the automatic circuit to pin 3 of IC3, and the DC voltage to decide the pedestal level is fed back to the differential amplifier in IC3.

The pedestal level is adjusted by adding the DC voltage input to pin 1 of IC3 and decided by RV27 to the pedestal control voltage input to pin 3 of IC3 from the automatic circuit. The pedestal control voltage of the R and B channels are the output of the automatic black balance, and when the automatic black switch is set to ON, the voltage is decided so that the pedestal of the R and B channels becomes the same as that of the G channel.

The control signal of the master pedestal being set is also input to pin 3 of IC3 together with the R pedestal control signal.

11) White clip

The R channel signal input to pin 7 of IC5 is mixed with the DETAIL signal supplied from the SG-198 board to pin 6 of IC5, and white-clip is performed in the white clip circuit in IC5.

The WHITE BAL TRIG signal, sent from the automatic circuit is input to the logic circuit of IC8 and WHITE CLIP level set circuit composed of D14 and RV14 through RV16. The WHITE BAL TRIG signal at pins 4 and 5 of IC8 switches the WHITE CLIP level. This is because the level cannot be correctly compared in automatic white balance adjustment if the signal has been clipped. The G-ch, R-ch and B-ch white clip levels are adjusted by RV14, RV15 and RV16 respectively. Normally the WHITE CLIP point is adjusted to 115%.

The BLKG pulse is input to pin 2 of IC8 and the BARS CONT signal (active low) is input to pin 3. When the BARS CONT signal is OFF, the HIGH or LOW level of the BLKG pulse sent from Q76 is input to pin 10 of IC24 to switch the WHITH CLIP LEVEL at pin 1 and the GND signal at pin 2. In this way, the BLKG pulse is added to the main signal coming from pin 3 of IC11, as shown in Figure 4.

When the BARS CONT signal is ON, and as the outputs from pin 3 of IC8 and pin 15 of IC24 go low, the main signal is gated by the WHITE CLIP IC.

When the characters are displayed, the KEY signal is input to Q75 and is added to the BLKG pulse.

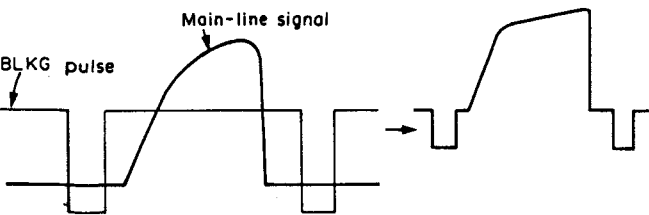


Figure 4 White clip

The signal output from pin 3 of IC5 passes the 14 MHz trap filter composed of R397, L2 and C154, and the buffer of Q135 and Q134, and is sent to the encoder circuit and automatic circuit.

12) Color bar generation circuit

The BLKG pulse sent from the automatic circuit is input to pin 13 of IC9, and reversed in IC9. Then it is input to the multivibrator. When the BLKG pulse is low level and the BARS CONT signal voltage input to pin 16 of IC9 from the automatic circuit is low level, the multivibrator operates. The multivibrator generates a signal equivalent to 14 cycles, two times of 7 lines of white, yellow, cyan, green, magenta, red and blue in the effective screen. The pulse width is adjusted by adjusting the width of black level by RV20. The output of the multivibrator is added to the binary counter in IC9, counted down to 1/2 and is supplied as B output. Then it is counted down again to 1/2 and supplied as G output. (Refer to Figure 5.) The BARS level is adjusted by RV19. The BARS signal of the G channel is sent from pin 2 of IC9, that of the R channel from pin 6, and that of the B channel from pin 7 to the BARS switch circuit in IC11, 5 and 16 respectively.

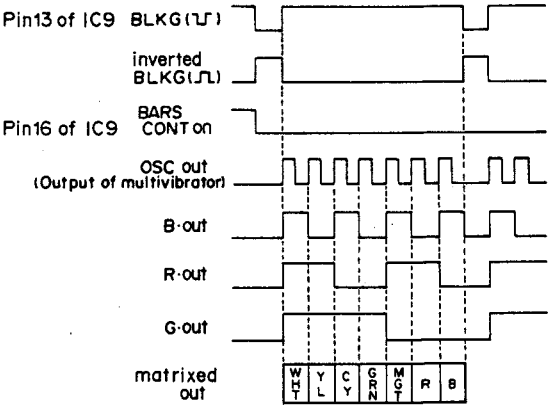


Figure 5 Color bar

<Automatic circuit>

1) Basic composition

The automatic circuit has functions such as automatic white balance, automatic black balance, automatic iris, character generator, etc.

The R or B channel signal is compared with the G channel signal, and the differences are detected. Then the analog DC output signal which reduced the difference to 0 is generated and supplied. MPU IC108 (HD44860342), is the center of the automatic control circuit, and the program is written in ROM of 2 k words in IC108.

Memory size of MPU:

ROM: 2048 words × 10 bits

RAM: 160 words × 4 bits

When "MEMORY: NG" is displayed, all analog control voltages are automatically set to the center value of the controllable range (pre-set mode: analog value DC + 2.5V). In this case, automatic white balance and automatic black balance should be adjusted again.

Figure 7 Name and function of pins of MPU

Fig. 7

PIN NO.	NAME	I/O	FUNCTION	CONNECTION
1	D4	O	CTL signal to memorize compensation data in the sample hold circuit. Execute the AND operation with pin 35 (R13), "L" during adjustment.	To pin 6 of IC109 and 110 through D116 and D117.
2	CAL	O	Selecting the video signal of "R" or "B" and "G". "H" for "R" or "B".	To pin 9 of IC101
3				
4			NC	
5			NC	
6	D9	O	Data set pulse output of a character generator	To pin 33 of IC115
7	+18	I/O	Input and output terminal of 18 dB GAIN CONT. "L": active.	+18 dB CONT OUT +18 dB CONT IN
8	+9	I/O	Input and output terminal of 9 dB GAIN CONT. "L": active.	To +9 dB CONT OUT From +9 dB CONT IN
9	CB	I/O	Input and output terminal of BARS CONT. "L": active.	To BARS CONT IN From BARS CONT OUT
10	TEST	I		
11				
12				
13				
14	LL	I	Input terminal for Low Light indication Always "L".	GND
15	BATT EMPTY	I	Input terminal of a battery alarm signal. Always "L".	GND
16	R43	I	Test terminal. When grounded, self-diagnosis of the automatic circuits is displayed on the monitor.	Connect to TP102
17	T/C	I		GND
18	R51	O	Output of CONT signal in each mode of automatic operation	To base of Q227 through R58
19			NC	
20			NC	

PIN NO.	NAME	I/O	FUNCTION	CONNECTION
21	RESET	I	Initializing the microcomputer when the power is turned on.	From IC121
22	GND	I	GND	
23	OSC1	I	Input block of IC. Approx. 400 kHz.	From X101, R508
24	OSC2			
25	HLT	I	Input terminal to temporarily stop the operation other than RAM. "H" when the power is turned on.	From IC122
26	TST	I		From collector of Q233
27	VCC	I	Power source	
28	CP	I	Input terminal for comparing the voltage of A/D conversion of R, G and B video signals during automatic black and white balance adjustment	From pin 7 of IC102
29	3200K	I	"H" when AUTO/MANU CONT is AUTO.	From W/B AUTO/MAN
30			NC	
31	PRESET	I	GND	
32	R10	O	Signal to switch the control (R/B GAIN, R/B PED, etc.) in order. 4 bits x 3	To pin 11 of IC109, IC110
33	R11			To pin 10 of IC109, IC110
34	R12			To pin 9 of IC109, IC110
35	R13	O	Control signal to memorize compensation data in sample hold circuit.	To pin 11 of IC110, D116
			"H" is output when lens iris is closed during black balance adjustment.	To base of Q203
36				
37	INTI	I	Interruption input port VD pulse is input.	From pin 8 of IC117
38	R20	O	Output the parallel data of controls (R/B GAIN, R/B PED, etc.) to the D/A converter. 8 bits	To pin 9 of RB101 To pin 2 of IC115
39	R21			To pin 8 of RB101 To pin 3 of IC115
40	R22			To pin 7 of RB101 To pin 4 of IC115
41	R23			To pin 6 of RB101 To pin 5 of IC115
42	R30			To pin 5 of RB101 To pin 6 of IC115
43	R31			To pin 4 of RB101 To pin 7 of IC115
44	R32			To pin 3 of RB101 To pin 8 of IC115
45	R33			To pin 2 of RB101 To pin 10 of IC115
46			NC	
47			NC	
48			NC	

PIN NO.	NAME	I/O	FUNCTION	CONNECTION
49	R63	O		
50	CCU ID	O	The gain selector of the camera is disabled. "H": active when set to CCU or AUTO BLK.	To CCU ID OUT
51			NC	
52	AWB	I/O	Control input terminal of AUTO WHT BAL. "L" level is kept during AUTO WHT BAL.	From WHT BAL TRIG IN to D103
53	ABB	I/O	Control input terminal of AUTO BLK BAL. "L" level is kept during AUTO BLK BAL.	From BLK BAL TRIG IN to emitter of Q227

(2) Block diagram

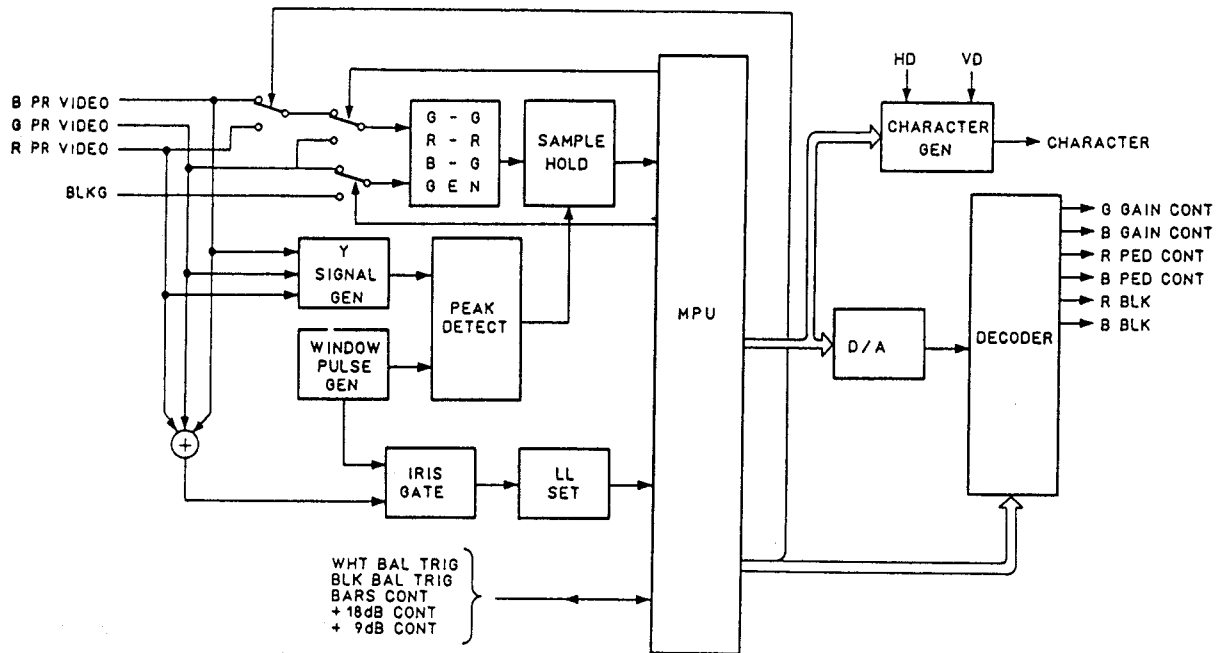


Figure 8

(3) Circuit description

1) Automatic white balance circuit

To adjust the white balance, the level difference of the R, G and B signals of the white part should be minimized when an object with a white part is shot. The R, G and B signals are obtained from the process circuit, and are mixed, and the peak level of the dummy Y signal is assumed as a white level.

The amplitude difference of the R and B signals is obtained by referring the G signal, then $(R - G)$ and $(B - G)$ signals are made.

The $(R - G)$ signal is sampled by the Y signal mentioned above, and the differential voltage is detected.

After A/D conversion of the differential voltage, the differential voltage is memorized in the microcomputer. The digital signal output from the microcomputer is returned to the gain control circuit of the R or B signal after D/A conversion, and the amplitude difference of (R and G), or (B and G) is set to the same.

The loop is made so that $(R - G = 0)$ or $(B - G = 0)$ is obtained. When the differential voltage becomes minimum, "WHT: OK" is displayed on the monitor screen.

This loop functions only when the AUTO switch is set to white, and the R gain or B gain control signals, which satisfy the $(G - G) = (B - G)$ or $(R - G)$ signal, are converted to an 8-bit digital signal. The data is stored in RAM of a microcomputer, even if the AUTO switch is set to off, and the R and B gain control signals are stably supplied to the process circuit as long as power to the memory circuit is supplied. (back-up memory)

The R signal (base of Q236), G signal (base of Q202) and B signal (base of Q201) are supplied from the process circuit as a signal of 1.4 V p-p when a white subject of a 100% video signal is shot.

These R, G and B signals are buffered by Q236 (R), Q201 (B) and Q202 (G), and the G signal is input to pins 5 and 2 of the IC101 analog switch.

When the white balance switch is set to ON, the analog switch IC101 is set to NC, and the G signal is input to the (+) and (-) terminals of the differential amplifier of Q204, 205 and 207, and a $(G - G)$ signal is made.

The differential output of $(G - G)$ is buffered by Q206, and clamped to 0 V by the HD pulse in Q208.

Then it passes the buffer amplifier of Q209 through Q212, and is sampled and held by the Y peak signal by Q213, C209 and C213.

The Y peak signal is made from the dummy Y signal by mixing the R, G and B signals in resistor matrix ($Y = 0.5G + 0.25R + 0.25B$) of R434 through R436 after being buffered by Q236 (R), Q201 (B) and Q202 (G).

The dummy Y signal is amplified by 10 dB to the level of the gate circuit in the next stage by Q216, and is gated by the white window pulse in D104.

The signal is gated by the window pulse because the detection of white balance is executed by the signal in the circle with a diameter of 75% width on the screen but not all over the screen.

The window pulse is made from the H and V parabola waves.

The H and V parabola waves are input to the collector of Q220.

Q220 is set to off during automatic white and black balance adjustment, and to on in other cases, i.e., the H and V parabola waves are picked up and added to pin 3 of comparator IC103 during this period only.

The comparator makes the window pulse by clipping the level lower than the reference voltage input to pin 2. The detecting range of white balance is decided here.

The dummy Y signal is picked up by D104 in the HIGH period of the window pulse, and is buffered by Q217, and added to the video amplifier Q218.

The emitter of Q218 is grounded through D102 (forward direction bias) so that a signal lower than 0 V is not output, i.e., the D102 functions as a clip.

The purpose of this clip is to obtain the brightest (Y peak) signal at the center of the screen.

This Y peak signal is amplified to the FET input level of the sampling circuit Q213 (2SK94) by Q218 and Q219. The (G - G) signal mentioned before is sampled and held by this Y peak signal, amplified by the operation amplifier IC104, and compared with the 8-bit digital signal output from the microcomputer by IC102 of the comparator. Then A/D conversion is performed.

The 8-bit digital signal after A/D conversion by IC102 is memorized in IC108 as a reference voltage ((G - G) differential voltage).

Conventionally an (R - G) signal is directly made. However, the signal is affected by the temperature characteristics of circuits and aged deterioration in the process of making the R - G signal. To avoid this, the (G - G) differential voltage is first made, and (R - G) or (B - G) is compared by referring to the voltage.

When the reference voltage of (G - G) is memorized, the microcomputer sends the order of the next step, and analog switch IC101 is switched to R (to pins 12 and 3). Then (R - G) is obtained by differential amplifier Q204, 205 and 207, and it is memorized in the microcomputer as a differential voltage of (R - G) by the same route as (G - G).

The differential voltages of (G - G) and (R - G) memorized in the microcomputer are compared in the microcomputer, and when the difference is within 1 bit (least significant digit of 8-bit signal), the system decides that the white balance is adjusted.

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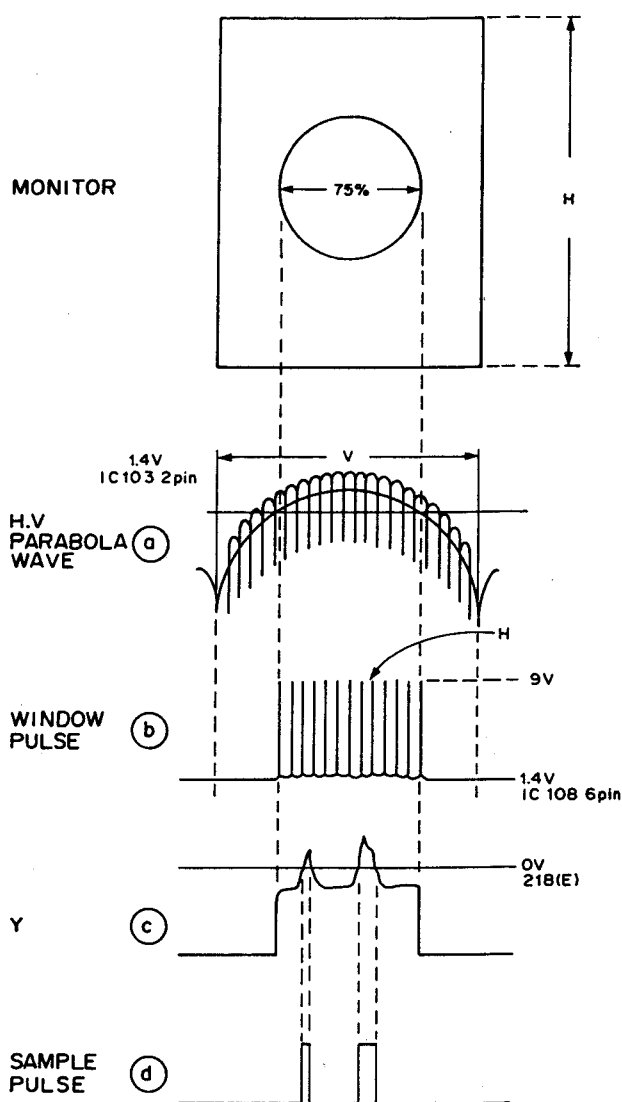


Figure 9

The CTL in the range from maximum value 11111111 (analog output of 5 V) to minimum value 00000000 (analog output of 0 V) is output. When the R gain control is finished, next stage (B gain) begins.

The B gain control is the same as the R gain control.

The compensation signal, R gain (or B gain), is made by comparing it with the R gain (Z) prepared by the software of the microcomputer (RAM).

The compensation signal (R gain) of $(Z - \Delta)$ is output from the microcomputer as $(R - G) - (G - G) = \Delta$.

$$Z - \Delta \rightarrow Z$$

This compensation signal is a digital signal so that it is D/A conversion is performed by the ladder resistor of RB101, and buffered by IC112, and supplied to analog switch IC109/110.

As VD is considered as a cycle, this data includes 16 channel data, and is controlled by the output of the microcomputer (pins 32, 33, 34, 35 and 1) in each mode, and the data corresponding to the mode is output.

The 3VD period is repeated until the amplitude of the R signal becomes the same as that of the G signal. In case of $(R - G) - (G - G) > \Delta$ the compensation of $(Z - \Delta \rightarrow Z)$ is performed in the microcomputer.

If the white balance cannot be adjusted within a 3VD period, $(R - G)$ is made again as a new data, and the same procedure is repeated.

When the compensation of the R channel is completed, one of the analog switches in IC101 is switched to pin 13, and the gain control of the B signal begins.

When the gain is controlled so that the amplitude of the B signal becomes the same as that of the G signal, like the R signal, it is written in the 8-bit RAM, and the white balance adjustment is completed.

When the control completed, the closed loop of microcomputer IC108 is opened, and the gain is controlled by the data stored in the 8-bit RAM.

This is executed within about 1 second.

When the white balance adjustment is completed, a character generator functions, and the operation mode is displayed on the monitor. When the white balance has been adjusted, "WHT: OK" is displayed on the monitor screen.

2) Automatic black balance circuit

Automatic black balance adjustment is executed as follows. A detection circuit system is almost the same as that of an automatic white balance adjustment circuit.

i. A lens iris is forced to be closed mechanically, and the close of the iris is electrically checked by detecting light input.

ii. Black tracking operation

Black tracking is the operation with which the black level of an output signal does not change as the GAIN selector setting is changed to 0 dB, + 9 dB and + 18 dB with the lens closed. The operation is executed in order of $G \rightarrow B \rightarrow R$.

iii. Black balance operation

Black level of the R and B channels is adjusted so that it becomes the same by referring to that of the G channel.

[Operation for closing an iris]

For automatic black balance adjustment, light input should be cut. So the lens iris is forced to be closed when the AUTO BLK switch is pressed independent of the AUTO/MANUAL selector setting.

Black balance adjustment begins when the iris is confirmed to be closed by detecting whether the amplitude of a video signal of the G channel (master) becomes 0 (pedestal level).

When the black balance switch is set to ON, the level of pin 53 of microcomputer IC108 becomes "L", and "L" is kept during black balance adjustment. A high-level signal is output from pin 8 of IC108, and Q227 is set to ON. Then "L" signal from pin 53 of IC108 is added to D111. Q222 is then set to ON, and "H" voltage appears at the collector of Q222, which is added to the lens as a lens iris close signal, and the lens is closed.

When the lens iris is closed, the R, G and B signals from the process circuit are supplied at a pedestal level (without a video signal).

During automatic black balance adjustment, as the "L" level is kept at pin 53 of IC108, an "H" level is added to D122 through inverter of IC107.

As an "H" level is also supplied to the other end of D122 from the microcomputer, the output of D122 is the result of an AND operation, and is supplied to pin 10 of analog switch IC101, which is switched to NO (pin 1).

As a blanking signal is supplied to pin 1, it is added to the (-) side of differential amplifier Q204, 205 and 207 through this switch.

The G signal is added to the (+) side of the differential amplifier through pin 5 and pin 4 of another analog switch IC.

A "G-BLKG" signal is obtained as a differential amplifier output. As the BLKG signal in this case is output with HIGH impedance of only R407 (1.2 k ohms) until the iris is closed because Q203 is set to OFF, wide amplitude can be obtained.

If a G signal is used instead of a "G-BLKG" signal, a correction detection in the microcomputer is impossible because the pedestal level of the G signal can be manually adjusted and the amplitude of the G signal becomes narrow by temperature characteristics of the circuit or misadjustment.

To avoid this, when the AUTO BLK switch is set to ON, a master pedestal level is raised by a MASTER PED control signal.

"G-BLKG" signal, output of a differential amplifier, is stored in memory of the microcomputer after A/D conversion in the sample and hold circuit in the same manner as white balance adjustment.

When the "G-BLKG" signal becomes the value equivalent to 50 of the differential amplifier output, (microcomputer output: 10000000 = 80 CTL), the system decides that the iris is closed. To confirm the lens close, A/D conversion of the differential amplifier output is performed twice, and when the difference becomes within ± 1 bit, the system decides that the iris is completely closed, and the next black tracking operation begins.

[Black tracking operation]

Even if the lens is closed, an output signal of a pre-amplifier contains a black current component of CCD. When the gain switch is set to +9 dB the black current is amplified in the process circuit, and the black balance cannot be kept because of the pedestal level change.

Black tracking operation makes the pedestal level of the R, G and B signal outputs not change even though the gain select switch setting is changed to 0 dB, 9 dB and 18 dB with the lens closed to obtain a stable pedestal level. When the lens closed is confirmed, Q203 is returned to ON, and the standard blanking level is obtained.

As a minus input of a differential amplifier, a blanking pulse is added through pins 1 and 15 of IC101, and the G channel signal is added as a plus input through pins 5 and 4 of IC101. Thus a G-BLKG signal can be obtained from the differential amplifier.

A/D conversion of the G-BLKG signal is performed with the gain of 0 dB, and the data is memorized in the microcomputer. Then a +9 dB gain-up control signal is output from pin 8 of microcomputer IC108, which sets the gain of the process circuit to +9 dB. The G-BLKG signal at +9 dB is made in the same way as at 0 dB. Then it is memorized in the microcomputer and compared. Even if the level difference Δ between the G-BLKG signals at 0 dB and at +9 dB is output as a compensation signal, the pedestal level after the compensation is the value at +9 dB, which has no mean for compensation. Therefore $\Delta/2$ is added to IC101 in the process circuit as a compensation signal, and the G-BLKG signals at 0 dB and at +9 dB are compared again, and a compensation signal of $\Delta/2$ is output. This operation is repeated until the pedestal level difference at 0 dB and +9 dB does not occur. When the level difference Δ between the G-BLKG signals at 0 dB and at 9 dB becomes within ± 1 bit, the microcomputer decides that the black tracking operation for the G channel is completed, and the adjustment for the R channel and B channel begins. When the adjustment of all channels is finished, black tracking operation is completed.

[Automatic black balance operation]

In automatic black balance operation, an output of the process circuit is observed with the lens closed. (G - R) and (G - B) are obtained by comparing the G channel black level with those of the R and B channels in order, and the (R-PEDESTAL) and (B-PEDESTAL) DC signals are supplied to the process circuit to make (G - R) and (G - B) 0, and the pedestal level of R, G and B is adjusted to the same level.

A reference signal is made from (G - G), and A/D conversion of (R - G) is performed. Then the R-PEDESTAL signal is made by D/A conversion of the difference between (G - G) and (R - G), and is supplied to the process circuit. The same procedure is performed for (B - G). These operations are the same as those of the automatic white balance operation except that the lens is closed in the automatic black balance operation.

As a Y signal of a sampling pulse is 0, black balance, black tracking and lens close cannot be detected by the peak detection. To output High to the Y signal line constantly by the peak detection of Q218, DC voltage is added by setting the base of Q215 to High with the black balance switch set to ON. Then the window pulse made by a H/V parabola wave is added to the Q213 sample and hold circuit as a sampling pulse for black balance adjustment. When black balance of (R - G) and (B - G) is adjusted, "BLK OK" is displayed on a monitor screen for about 4 seconds.

3) Automatic iris adjustment circuit

The R, G and B channel signals sent from the process circuit are mixed in NAM (Non Additive Mix: the largest signal of R, G and B signals is output) circuit of D107 and D108, and passes R462. A BLKG signal which has passed R461 and a V SAW signal which has passed R464 and D109 are resistor-mixed with the NAM signal, which is input to pin 12 of the IC104 buffer.

The output of pin 14 of IC104 is peak-detected by C225, and average-detected by R465 and C226, and resistor-mixed by RV102. In the circuit, the level from peak to average can be changed by RV102.

An output of the average detection is input to pin 6 of IC103, and is used to detect "LOW LIGHT".

RV101 is an adjustable resistor to set the LOW LIGHT indication, and can adjust the video level from 40 to 47 IRE. This makes the indicator light in LOW LIGHT.

The output whose ratio of the peak and average value is decided by RV102, is input to pin 6 of the differential amplifier IC104. The reference voltage input to pin 5 of IC104 is decided by RV103, which decides the iris setting. Auto iris output voltage can be changed from 2.0 V to 7.4 V for adjusting the lens from open to close. However, to avoid hunting at the close end, a 3.4 V limiter is provided in D112.

The V SAW TOOTH signal is mixed at the input of an automatic iris adjustment circuit to detect the video level at lower 2/3 part of the screen. Then if the highlight such as a blue sky is shot in outdoor shooting, the automatic iris adjustment is not affected.

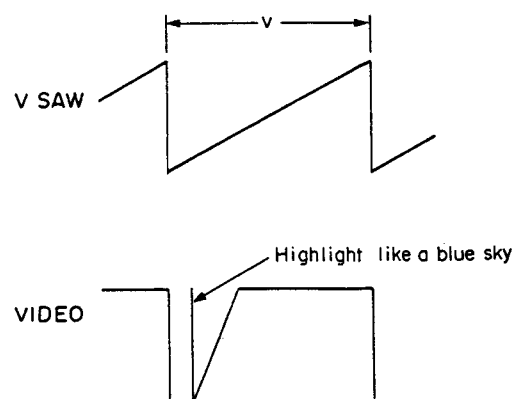


Figure 10

4) Character generator circuit

Character is generated by IC115 (MN1237AD) in ROM. The data to display the conditions of white balance and black balance operation (WHT: OP or BLK: OP), and the results of the operation (WHT: OK, WHT: NG, etc.) is input from the microcomputer.

5) Peripheral circuits of automatic adjustments

[Reset circuit when the power is turned on]

This circuit initializes the microcomputer by the rising edge of +5 V power source with a switching operation of Q231. IC121 and IC122, a voltage detector, controls the rising and falling characteristics of a power source within the specification of the microcomputer.

[Preset/memory selection circuit]

IC108 is a 1-chip C-MOS type microcomputer whose operating current is only 1 mA. In HLT mode, the current is further lowered to 1 μ A.

In HLT mode, an operation of the microcomputer is temporarily stopped, and the data only in RAM is kept.

When the level at pin 25 of IC108 is "LOW", i.e., the power is OFF, HLT mode is obtained. In HLT mode, the charge stored in a large capacity condenser (C271: 0.1F) as a back-up power source, is used as a power source of the microcomputer when S101 is set to OP. The back-up memory is kept for about a week. If the back-up condenser is discharged or S101 switch is set to ADJ, "MEMORY: NG" is displayed on a monitor when the power is turned on. When "MEMORY: NG" condition is set, all analog control voltages are automatically set to the center value of a controllable range (pre-set mode: Analog value DC + 2.5 V).

In such a case, adjust the automatic white and black balance again.

The ADJ position of S101 is used for maintenance adjustment. When the adjustment is finished, be sure to set the switch to OP.

<Mix circuit>

(1) Basic composition

The mix circuit is an interface circuit with the external equipment, and the composition is as shown below.

- R, G and B output
- External character generator mix
- Internal character, AUX IN mix
- Component output

(2) Circuit description

1) R, G and B output

The R, G and B output is a circuit used to supply the R, G and B signals sent from the process circuit to the external equipment with a 75-ohm driver.

The G channel signal input from the process circuit passes the grounded base amplifier of Q304, and is buffered by Q305, then is sent to the external equipment with a 75-ohm driver composed of Q306 and Q307. A SYNC signal is sent to pin 1 of IC116 from the SG-198 board. It passes grounded base amplifier Q316 and the Q315 buffer, and mixing is performed at emitter of Q304. The SYNC level is adjusted by RV201, and L/H at pin 2 of IC116 controls ON and OFF of the SYNC signal.

2) External character generator mix

This is a circuit used to mix the R, G, B and KEY signals sent from a title generator with a main-line signal.

In the G channel, a G character signal sent from the title generator passes grounded base amplifier Q320, is buffered by Q321, and mixed with the main-line through D211.

On the main line, a character signal of about 1.2 V p-p appears. The KEY signal sent from the title generator is a signal for the OR operation of R, G and B and for black characters, and input to the base of Q76 in the process circuit. A blanking signal is also input to the base of Q76, and the blanking pulse is set to LOW at the phase when the KEY signal is input. Therefore, when the KEY signal is input to the base of Q76, a black character appears as a process output. When the signal is input to a character input of R, G and B, the R, G and B signals are added to the blanking level, and the character signal with a constant level can be obtained independent of the video level.

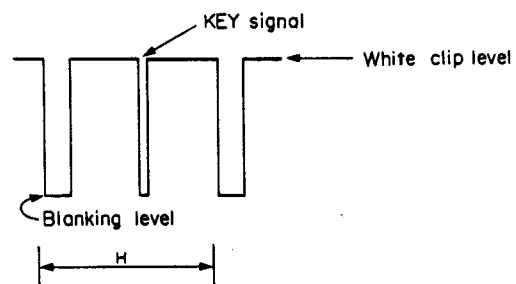


Figure 11 KEY signal

3) Internal character, AUX IN mix

The internal character mix is a circuit used to mix the warning indication output from an internal character generator with the main line signal.

A character from IC115 is input to the emitter of grounded base amplifier Q312 through R638, and is mixed with the main-line signal after passing the buffer of Q314. On the main line, a character signal of about 1.3 V p-p appears. The AUX IN mix is a circuit used to mix the cross hatch, window, title, etc. input from the external equipment with the main-line signal.

The signal input from the external equipment is terminated by 75 ohms. Then it is input to C311, passes the Q312 grounded base amplifier, and is input to the main line through the buffer of Q314. Q313 is an enable switch used to inhibit the internal character and AUX IN signal output in the color bar mode or during white and black balance adjustment.

4) Component output

The component output is a circuit used to compose the Y, R-Y and B-Y signals from the R, G and B signals sent from the process circuit.

The R, G and B signals sent from the process circuit are input to the bases of Q234, Q236 and Q235 respectively. The Y signal is made by the matrix resistor of R686, R687, R745 and R688, and the level is adjusted by the Q327 grounded base amplifier (RV202). Then the signal passes the buffer of Q328. Q329 and Q330 are the switches to select R, G and B outputs or a component output. There are two R, G and B outputs: One of them can be switched to the component output. The signal passed Q329, and is buffered by Q331, then is sent out by the 75-ohm driver of Q332 and Q333.

An R-Y signal is composed by the matrix resistor of R689, R690 and R691, and a B-Y is composed by that of R692, R693 and R694. They are sent out in the same way as the Y signal.

3-2. SG-198 board

The SG-198 board is composed of three blocks: the IE (Image Enhancer) block, SG (Sync Generator) block, and EN (Encoder) block.

<IE block>

The IE block consists of the circuits listed below:

- 14 MHz multiplier circuit
- 1H/2H DELAY signal generation circuit
- H/V DETAIL signal generation circuit
- Aperture compensator circuit

(1) 14 MHz multiplier circuit

This circuit multiplies the 14 MHz clocks of SG in order to provide the 28 MHz carrier signals which are required for the generation of the 1H/2H DELAY signals as described in the following subsection (2).

After a 14 MHz clock is received from SG by the 14 MHz multiplier circuit, it crosses the Q44 buffer then is divided into a two-stage delay block: the delay block consisting of C57, L19, and C58 as well as the delay block consisting of C110, L9, C111, L10, and C112. The former block respectively inputs the 4.5 V DC voltage into the respective multipliers of IC5. Because the two pin 4 and pin 10 inputs of IC5 are input with a $\pi/2$ (90°) phase difference (there is a difference of $\pi/2$ in the delay between the two delay blocks), the multipliers output 28 MHz pulses. These pulses are then sent via the Q45 buffer to the next circuit.

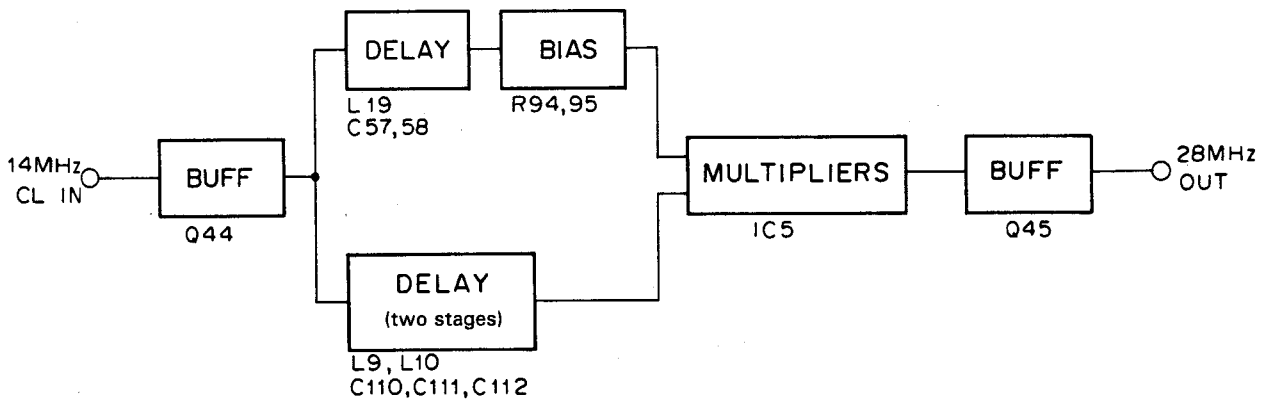


Fig. 2-1

(2) 1H/2H DELAY signal generation circuit

This circuit generates the 1H/2H DELAY signals which are required for the generation of the H/V DETAIL signals. Based on the input from the PR-162 board, the 500 mVp-p Gch signal has its high-pass component (around 28 MHz) cut off by the Trap Filter formed by L22 and C127, crosses the Q1 buffer, then is clamped by the Clamp pulse (CLP3) which is input to Q2. (The blanking section is 0 V DC.) Next, a Reference pulse is added to the video signal at IC4. At pin 10 of IC4, a single Reference pulse is input during the V blanking interval, then the pulse is added at a DC level determined by the resistive dividing ratio of R4 and R5. (This will be required for the AGC level adjustment of 1H/2H which will be discussed later.) The output of IC4 crosses the Q4 buffer, is amplified and modulated at modulator IC1 (the carrier is used for obtaining the 28 MHz pulse described in the preceding subsection), is input to the Q6, Q7, Q8, Q9, and Q10 drivers, then is input to the 1H DELAY LINE (DL1). The output of 1H DELAY LINE crosses the AGC (Automatic Gain Control) AMP formed by Q11, Q12, Q13, Q14, and Q15, enters the NAM circuit formed by Q16 and Q17, then the carrier component is dropped and demodulated at C25, L5, and CV2. The demodulated signal (1H delayed) crosses the Q20 buffer, is clamped at Q21, is subjected to pre-blanking cleaning at IC3, crosses the buffers of Q22, Q23, Q83 and Q84 and the LPF of R209 and C130, then is input to the 130- μ s DELAY LINE (DL2). This will later be used by the PR-162 board to perform phase alignment when adding the DETAIL signal to the video signal. The output of DL2 is adjusted to the required level by the base ground amplifier Q24, then is sent via the Q25 buffer to the PR-162 board, where it becomes a main signal line. At this time, the output of TP6 is 650 mVp-p.

On the other hand, the demodulated signal crosses the Q19 buffer, is clamped at Q28, then samples the Reference pulse at IC4. Similarly, the modulated signal crosses the Q26 buffer, is clamped at Q27, then samples the Reference pulse at IC4. The level of the two Reference pulses is input to the comparator IC2, the IC2 output is sent to Q13, then the level of the 1H DELAY signal is controlled by the AGC AMP. Consequently, the 1H DELAY signal is maintained at the same level as the input signals. A slight difference in level which is beyond control has been designed to be corrected at RV7.

Moreover, for the purpose of generating the 2H DELAY signal, the output of the AGC AMP is input to the driver formed by Q29, Q30, Q31, Q32, and Q33, then passes through the 1H DELAY LINE. The circuit for 2H DELAY signal generation is exactly identical to that for 1H DELAY signal generation. This enables 1H DELAY and 2H DELAY signals to be obtained which have the same level as the input signals.

(3) H/V DETAIL signal generation circuit

1) V DTL GEN

The 1H DELAY and 2H DELAY signals produced by the 1H/2H DELAY signal generator are input together with the OH signal into the V DTL GEN, thereby generating the V DTL signal by the process shown in Fig. 2-2.

To obtain the V DTL signal, the 2H DELAY and OH signals are mixed (C) at the Q54 emitter and the 1H DELAY signal is applied to the Q54 base (doubled).

The V DTL signal passes an LPF (1.5 MHz, ± 3 dB) formed by L16 and C70, then is output by the Q56 buffer.

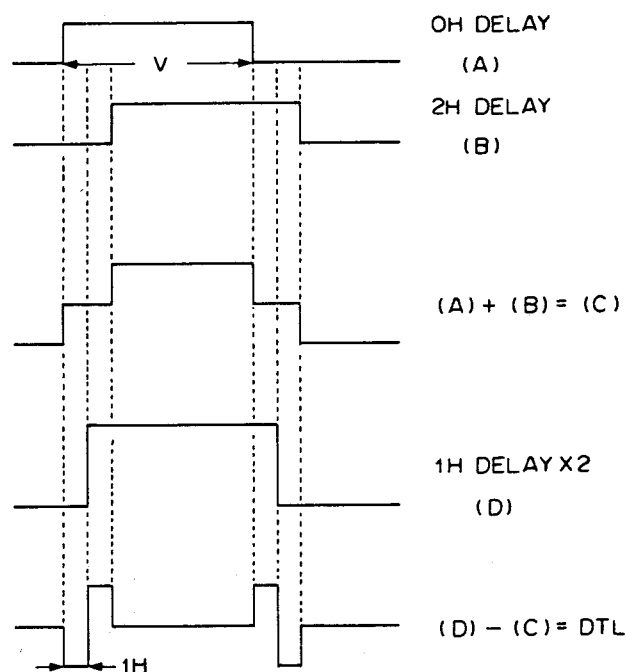


Fig. 2-2

2) H DTL GEN

To prevent the occurrence of beating while the DTL signal is conveyed by the 3.58 MHz subcarrier, the DTL signal first crosses a comb-shaped filter (R108, R109, R110) to completely eliminate the 3.58 MHz component. The SC component of 3.58 MHz has the same phase as the mixed non-delayed OH signal and a 2H DELAY signal. In contrast, the 1H DELAY signal has an inverted phase (as shown in Fig. 2-3), so the combining of these signals will mutually cancel the phase difference.

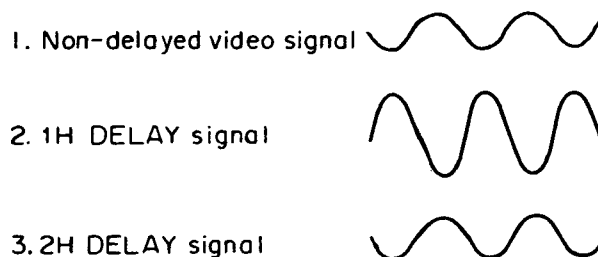


Fig. 2-3

This unit generates the H DTL signal by mixing the G-CH signals of 0H, 1H, and 2H delay with the R-CH signal from the PR-162 board.

Because only the G-CH signals lack resolution, the H DTL signal is generated after mixing in the R-CH signals obtained by staggering the pixels. The H DTL signal is generated by the process shown in Fig. 2-4. These H DTL and V DTL signals are mixed at RV1, then are adjusted at RAT10.

1. Input signal

2. Primary differential output

3. Rectified output

4. Secondary differential output
(H DETAIL signal)

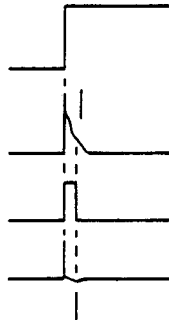


Fig. 2-4

Although the resulting signal crosses the Q51 buffer then is differentiated at the differentiating circuit formed by L14 and C66, it then crosses the Q52 circuit and is again differentiated by the differentiating circuit formed by L15 and C67, then the H DETAIL signal is output by the Q53 buffer.

This H DTL signal component is based on a 4-MHz frequency.

3) Crispening

The signal resulting from the mixture of the H and V DTL signals is amplified at IC6, crosses the Q58 buffer, then is again input to IC6. The DTL signals are separated into the positive and negative poles then respectively subjected to limiting. As shown in the figure, all signals except the DETAIL signals contain a high-pass noise component. To prevent a drop in the signal/noise ratio due to this high-pass noise component, therefore, the high-pass noise component is removed by crispening (by limiting).

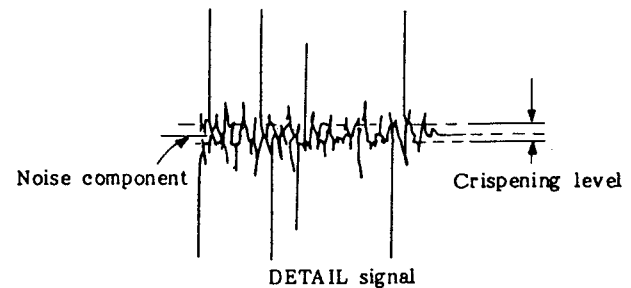


Fig. 2-5

Moreover, when the high-pass noise component is +18 dB, Q57 is switched OFF by the CONT signal from the PR-162 board, thereby raising the pin 11 voltage of IC6 so that crispening is intensified to prevent the deterioration of the signal/noise ratio. The positive and negative DETAIL signals are respectively output from pins 6 and 7 of IC6 and combined, then are input to control amp (IC7) after being cleaned at Q59. The Control signal from the DTL VR on the CCU's front panel is received at pin 8 so that the level of the DTL signals can be controlled. RV6 functions to adjust the clip-position level of the DTL control knob. The DTL signal is output from IC7 and drives the Q79 buffer. The output of Q79 is mixed with the Aperture Compensator signal (to be discussed in the following subsection), crosses the Q81 AMP and Q80 buffer, then is sent to the PR-162 board.

(4) Aperture compensator circuit

When the pixels have been staggered to compensate for the inadequate resolution of only G-CH, this circuit generates a signal to supply that high-pass component. Using this circuit, a maximum resolution of 750 lines can be achieved.

The G-ch IH DELAY signal which was clamped at Q28 branches before entering pin 3 of IC4. It passes through the buffers Q85 and Q86 and goes to the G PHASE ADJ circuit which is composed of S2 and DL5.

The R-ch signal that was buffered by Q50 is then buffered by Q90 and Q91 and goes to the R PHASE ADJ circuit which is composed of S3 and DL6.

The above two signals pass through the buffers Q87 and Q92 respectively and are then mixed at RV10. The mixed signal (whose mixing ratio was determined by RV10) is input to DL3, S2, S3 and RV10 are used to adjust the phase and level for higher resolution. (Refer to Fig. 2-6.) Because the DL3 output is not terminated, however, it is reflected (3) so that the input to DL3 becomes the waveform (4). (4) is reflected at Q64 and crosses the Q65 buffer, then becomes the waveform (5). On the other hand, output (2) of DL3 is input to the Q63 AMP so that (4) and (2) are mixed to obtain (6). RV3 is set to the level indicated by the arrow.

The peak of this high-pass component is 10 MHz.

The high-pass component generated in this way crosses the Q66 and Q67 AMP then is input to DL4 for the purpose of aligning the phase of the Aperture Compensator signal with that of the video signal.

At the crispening circuit which consists of two NAM circuits formed by Q69, Q70, Q71, and Q72, the DL4 output is respectively clipped at its upper and lower limits then is mixed (the processing principle is identical to that described for the DTL circuit). The resulting output is subjected to level adjusted at the AMP formed by Q73, Q74, and Q75, is cleaned at (RV5) IC8, then is output by the Q78 buffer. It is later mixed with the DTL signal and sent to the PR-162 board.

It is also possible to switch OFF the Aperture Compensation signal using S1.

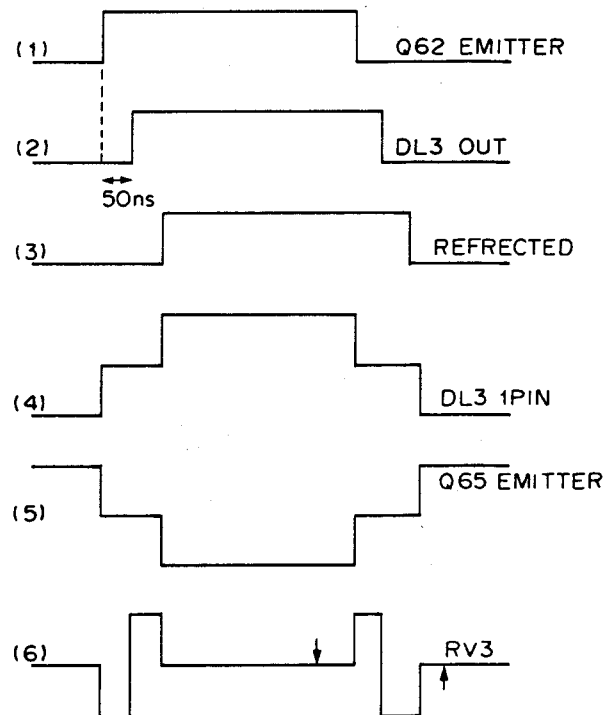


Fig. 2-6

<SG block>

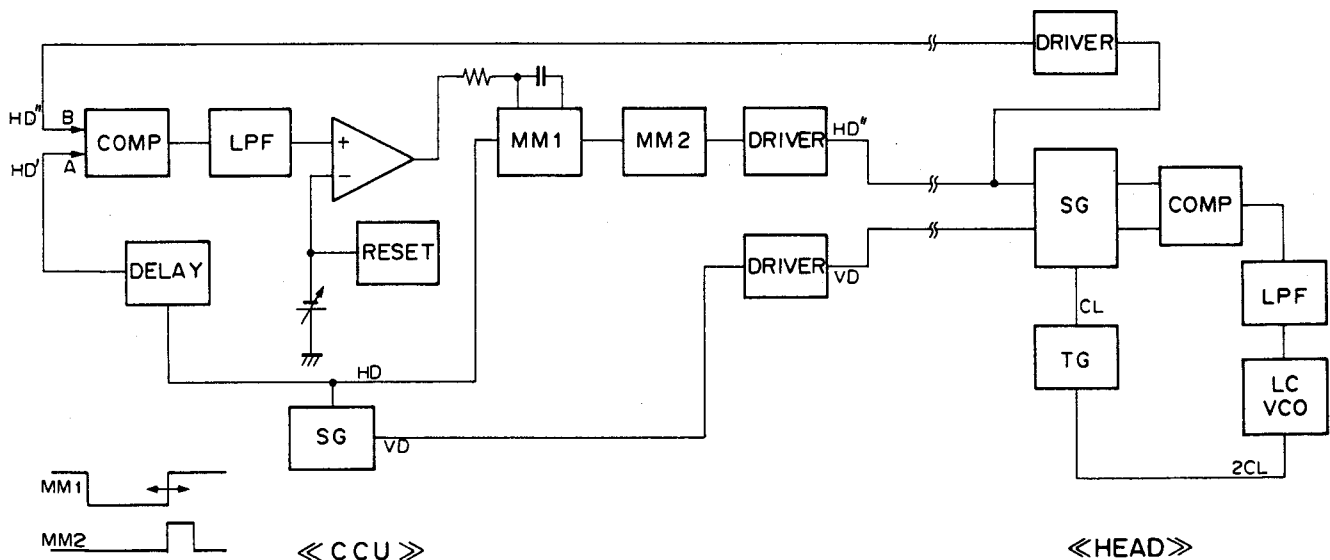
The SG block consists of the circuits listed below:

- HEAD/CCU sync circuit
- Internal/external sync circuit
- CLP1/CLP3/H SAMPLE/PRE BLKG generation circuit
- BLKG generation circuit
- CLOCK/HD/VD/SYNC driver

(1) HEAD/CCU sync circuit

The DXC-755/755P/760MD is a two-piece camera and the distance between its head and CCU can be extended to a maximum of 100 meters. The phase deviation between the head and CCU increases in proportion to the increase in distance, and phase alignment between the head and CCU must be performed each time that a cable of different length is used. Since automatic phase alignment is crucial to image measurement for medical purposes, which is one of the applications considered for this set, it was decided to provide a circuit that constantly maintains a fixed phase between the head and CCU.

The following figure shows a block diagram of this system. HD and VD signals are sent from the CCU to the head, then the head section of the system enters HD/VD GEN-LOCK mode. The HD signal that was sent to the head is returned to the CCU where it is compared with an internal HD signal, then a mono-stable multivibrator (MM) used to align the phases by shifting the phase of the HD signal to be sent to the head. That is, the longer the cable length, the faster the phase of the HD signals sent from the CCU.

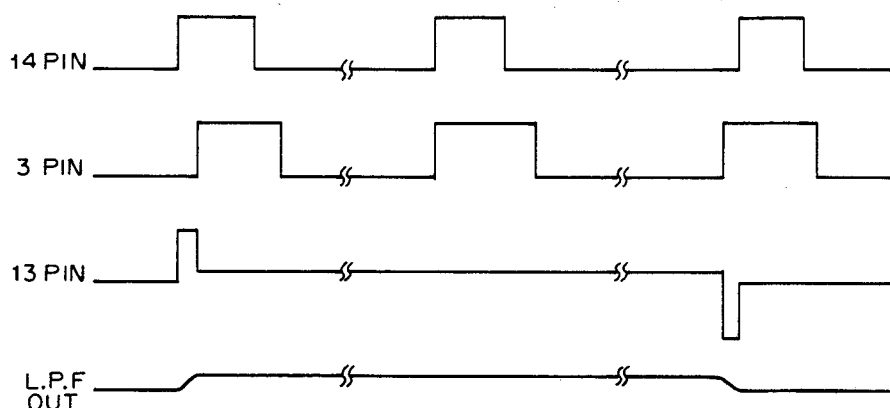
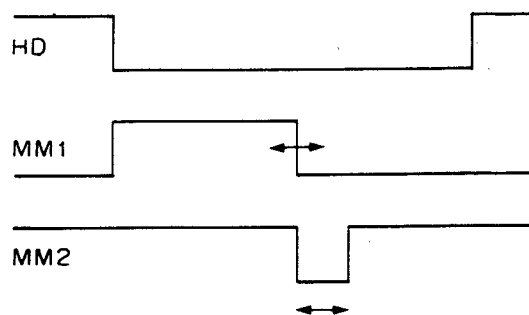


The HD signal received from the SG-150 board is inverted at Q131 and then input to IC102. The pulse (positive) is output from IC102 at the rising edge (beginning). That pulse is input to another mono-stable multivibrator, then the pulse (negative) is output at the falling edge (end). The pulse next crosses the Q133 buffer, and is output by the driver formed by Q153 and Q154 (for transmission to the head). The VD signal is also sent from the SG-150 board, crosses the Q104 buffer, then is similarly output by the driver formed by Q105 and Q106.

The HD signal which is returned from the head is subjected to a DC cut at C206, terminated by $75\ \Omega$, speeded up at C207, inverted at Q101, inverted again at Q102, then subjected to waveform rectification and input to pin 3 of IC101.

On the other hand, the HS pulse received from the SG-150 board (the pulse that lags $3.64\ \mu\text{s}$ after the all of HD: see the operating description of the SG-150 board) is input to pin 14 of IC101 where it serves as the reference pulse in the comparison of two pulses. As shown in the following figure, the output of pin 13 crosses an LPF (R310, C209, R311, C210) and the Q123 buffer, then is input to the OP AMP of IC103. Although a DC gain that is approximately three-fold exists, turn RV101 to adjust the DC gain to approximately 2.6 V DC at TP108. (When the cable used is 2.5 or 5 meters long.) This OP AMP output is input to mono-stable multivibrator IC102 where it is converted to DC voltage, thus changing the pulse width of MM1, shifting the pulse of the HD (MM2) signal to be sent back to the head, and achieving phase synchronization.

Furthermore, this circuit is designed to reliably achieve synchronization whenever the power is turned on or a reset operation is executed. The one-second reset time is determined by R535 and C341, during which time Q156 is switched ON and the + side of C211 is forced to 9 V. This ensures phase-locking when the power is turned on.



(2) Internal/external sync circuit

This unit consists of three sync modes as follows:

- a. Internal sync mode (INT)
- b. VBS GEN-LOCK mode
- c. HD/VD GEN-LOCK mode

1) Internal sync mode (INT)

During NTSC use, the DC controlled by RV102 is received from the SG-150 board, and the clock frequency is adjusted to this input. Next, the required pulses are output from the SG-150 board.

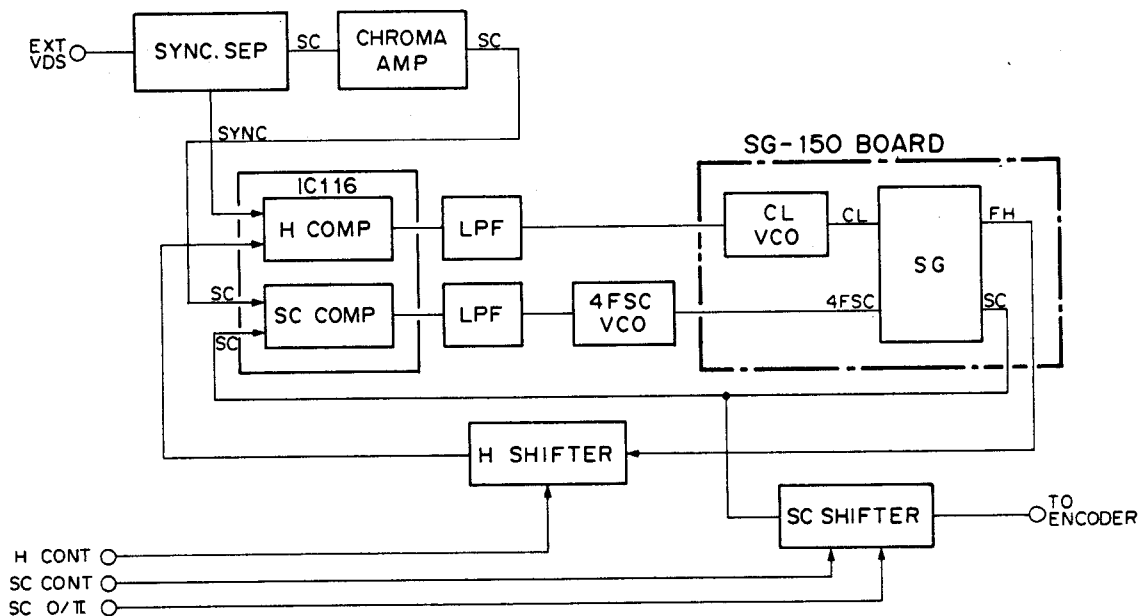
During PAL use, Q134 is switched ON and CP2 becomes active. The DC of RV102 is sent to CP2, then 4FSC is sent to the SG-150 board. In addition, the INT H COM signal which was output from the SG-150 board is input to pin 10 of IC116, crosses internal drivers, is output from pin 9, crosses an LPF (R396, R397, C276, C277) and a buffer (Q132), then is returned to the SG-150 board. This DC is used to control the clock.

Moreover, the phase of the SC signal received from the SG-150 board can be changed at IC126 and IC127. During internal sync mode, however, IC120 enables the output of the SC signal to the encoder after its phase has been controlled by RV104. (The SC-H Adjustment)

2) VBS GEN-LOCK mode

A block diagram of operation in VBS GEN-LOCK mode is shown on the following page.

The EXT VBS signal initially enters the SYNC SEP circuit then is split into the SYNC and SC (chroma) signals. Phase deviation caused by the GEN-LOCK VBS cable is corrected by the cable corrector (C218, R320), ham noise is cancelled at the floating AMP formed by Q107, Q108, and Q109, the resulting signal then crosses the Q110 buffer, is clamped at D104, and enters the Q111 AMP. From Q111, the chroma component is sent from the emitter to the chroma AMP. The chroma component of the signal output from the Q111 collector is removed at the trap circuit formed by C229 and L106, then the remaining SYNC/Y signal is input to the Q112 buffer. The Q112 output is subjected to sync-gated and delayed at Q113 and Q114, and its backporch is clamped during the sync gate interval. Next, it crosses the Q116 buffer and an LPF formed by R349 and C236, enters the Q117 buffer from which it is output at 1/2 level due to the resistive voltage division of R351 and R352.



At the Q117 emitter, the AC portion of the signal is almost entirely lost. That is, the 1/2 level SYNC signal is input to pin 2 of the IC104 comparator. Because the clamped SYNC/Y signal is input to pin 3 of IC104, the GEN-LOCK signal will always be sliced to 50% of the SYNC signal for output of the SYNC pulse, regardless of the level of the GEN-LOCK signal. The SYNC pulse thus obtained is sent to the GEN-LOCK IC of IC116. In addition, only the SC (chroma) component of the Q111 emitter output is removed at the buffer formed by C240 and L108, the remaining signal is amplified at Q118, crosses the Q119 buffer, is limited to the C MOS input level by Q120 and Q121, then sent to IC116 by the Q122 buffer. At this point, to achieve internal synchronization with externally supplied SYNC and SC, the clock (H) loop and SC loop are locked.

In the H loop, the FH pulse received from the SG-150 board is input to the mono-stable multivibrator of IC125 and a pulse is generated from the falling edge of FH. The width of this pulse can be controlled by external DC control. Moreover, the output of pin 12 is fed back by the IC128 comparator to prevent changes in the pulse width due to fluctuations in the temperature. This pulse is input to IC116 where it is compared with an externally supplied SYNC and its output (pin 9) crosses an LPF formed by R396, R397, C276, and C277, and returns to the SG-150 board. Phase synchronization can thus be achieved by maintaining the internal H at a fixed phase with respect to external SYNC and by controlling the pulse width of IC125 (H shifter).

In the SC loop, the SC received from the SG-150 board is input to pin 18 of IC116 where it is compared with an externally supplied SC. At IC116, only the burst portion of the externally supplied chroma input is gated and compared with the internal SC. That output (pin 1) is removed at IC119 during the VD interval (the burst disappears during the V blanking interval, so the comparator output would be regarded as an error because there is nothing to compare during that interval), crosses an LPF formed by R404, R405, C284, and C285, is amplified at the IC132 OP AMP, then is input to the control voltage input of CP2 (4FSC VCO). (Approximately 3 V DC in locked status)

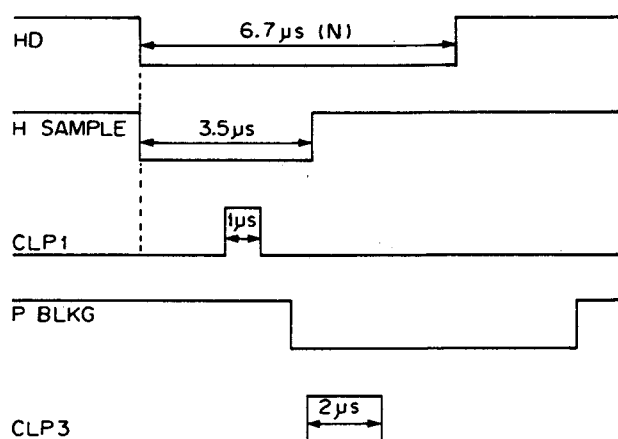
Next, the oscillated 4FSC is input to the sync generator IC of the SG-150 board, thus causing the internal SC to lock with the external SC (burst). The SC generated at the SG-150 board is sent to the encoder by the SC phase shifter formed by IC120, IC126, and IC127. The SC received from the SG-150 board is input to pin 2 of IC127 where its pulse width is amplified, then is output from pin 4. This pulse width can be controlled by external DC control. At such time, it will be fed back at IC126 and compensation for temperature fluctuations will be made.

That output is input to pin 10 of IC127, then is output at 50% duty (by Q and Q).

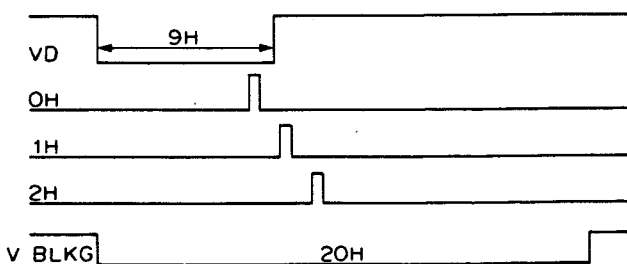
Consequently, the SC phase can be continuously varied by switching Q (pin 5) and Q (pin 12) in order to set the previously-mentioned pulse width to 0 or π . This enables the phase of SC output from the encoder to be synchronized with the external SC.

(3) CLP1/CLP3/H SAMPLE/PRE BLKG generation circuit

The CLP1 and H SAMPLE pulses are generated by IC109. The HD signal received from the SG-150 board has its high-pass noise component cut off at an LPF formed by R427 and C298, then is input to pin 1 of IC109. Similarly, the VD signal received from the SG-150 board crosses an LPF formed by R428 and C299, then is input to pin 3 of IC109 and is reset during this interval. This negative pulse from a mono-stable multivibrator is sent to the PR-162 board as the H SAMPLE pulse. In addition, the output of pin 13 is delayed at R384 and C257, then input to pin 10 to form the CLP1 signal.



The CLP3 pulse and PRE BLKG pulses are both generated by IC107 and IC108. However, these pulses are similarly generated by HD input to pin 5 of IC108, and the end of the generated pulse is used as a trigger. The output of pin 6 is connected to pin 11, and the PRE BLKG signals are generated at that mono-stable multivibrator. Furthermore, the output of pin 7 is delayed at R380 and C253, is input to mono-stable multivibrator IC107 where the CLP3 signal is generated. The Reference pulse used at IE is also generated at IC107. At the fall of VD, a negative pulse is generated at IC107 which is input to the shift register of IC106, then CLP3 signals output as clock (pin 3) pulse which have been respectively shifted by 8H, 9H, and 10H. At IC105, the signal is NOR-ed with the PRE BLKG signal, and the resulting output is used as the Reference pulse.



(4) BLKG generation circuit (only in NTSC mode)

BLKG GEN is formed by IC122, IC123, IC124, and D111 (NTSC).

The HD pulse received from the SG-150 board crosses the Q155 buffer and is input to pin 1 of IC122.

The H BLKG pulse, which is output from pin 4 of IC122, is AND-ed with the HD pulse at D111, then the result is supplied to pin 2 of IC124 as the H BLKG pulse.

The output of pin 13 of IC122 is again input to pin 9 of IC122 to generate the 1/2H pulse.

The 1/2H pulse is output from pin 5 of IC8 and is input to pin 5 of IC123.

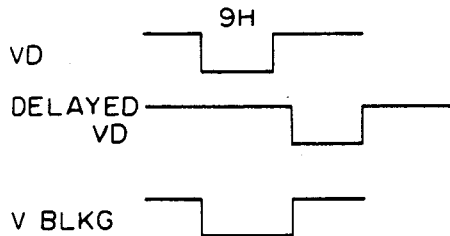
IC123 is a 19/20/21H shifter and the selection of 19, 20, or 21H is achieved by S102.

The VD pulse and HD pulse received from the SG-150 board are respectively input to pin 6 and pin 4 of IC123.

The pulse output from pin 10 of IC123 is input to pin 5 of IC124.

The clocks which rise at the fall of the 1/2H pulse and at the rise of the HD pulse are internally generated at IC9. At IC123, the VD pulse is received and shifted on the basis of these clocks.

Next, the VD pulse and the shifted VD pulse are input to the R-S flip-flop (IC124) where the V BLKG pulse is generated.



At IC124, the V BLKG pulse is being generated.

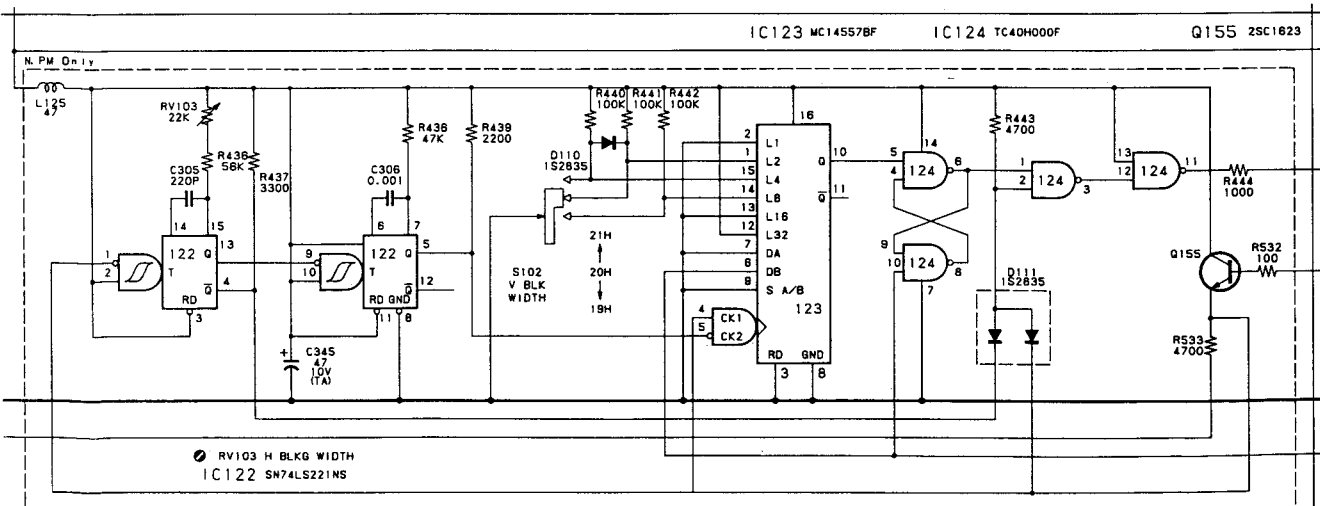
The H BLKG and V BLKG pulses are mixed at IC124, then output as the BLKG pulse to the PR-162 board and the encoder.

RV103 is a variable resistor used for adjusting the pulse width of the H BLKG pulse.

(5) CLOCK/HD/VD/SYNC driver

With the DXC-755/755P/760MD, it is possible to access the internally generated SYNC signal from the CCU's rear panel.

After the clocks are output from the SG-150 board, they are output by the driver formed by Q135 and Q136. The clock level is approximately 2.2 Vp-p (in terminated state). Although the same circuit is used for the HD, VD, and SYNC signals, the output from the SG-150 board is input to the inverter of IC121 and that inverter's output is output by the driver formed by Q138, Q139, and Q140. The signal level is approximately 4 Vp-p (in terminated state).



<Encoder Circuit>

The R, G and B signals sent from the PR-162 board are input to the circuits generating the Y (luminance), I (V) and Q (U) signals respectively.

(1) Y signal circuit

The Y signal generated when the R, G, and B signals are mixed through R601, 602 and 603 passes the Q201-204 amplifier, and is output to TP201.

The SYNC pulse passes Q240 and Q241 of IC202 and is mixed through this amplifier. The proportion of R, G and B is determined by that of R601-R603.

The Y signal then passes the delay line (DL101) to match the phase with the chroma signal, and is input to the 75 ohm driver circuit.

(2) I (V) and Q (U) signal circuit

The I (V) signal is generated by R644, R645 and R646 and the Q219-Q221 differential amplifier, while the Q (U) signal is generated by R677-R682 and the Q232-Q234 differential amplifier. R653, L207, C416, C417, R689, L211, C440 and C441 compose a low-pass filter to limit the band.

The burst flag output from pin 12 of IC202 is mixed with the I (V) and Q (U) signals at Q222 and Q236 respectively after passing Q235, and is then input to IC201 of the modulator.

The carrier balance is adjusted by RV203 and RV209 which are equipped to vary the input DC bias to compensate the offset of IC201.

On IC201, the subcarrier whose phase has been shifted by 90° each at C431, C432 and LV1 is input to pin 15 and pin 3.

After being modulated with the I (V) and Q (U) signals, the burst plus chroma signal is output from pin 8. This signal passes the BPF (FL1) and is output into the Q225 and Q226 inverting amplifier. This chroma signal and the above mentioned Y signal are mixed in the Q207-Q213 75 ohm driver circuit. The level twice the normal level (1 Vp-p) is output to TP202.

For the NTSC model, the blanking pulse output from pin 8 of IC202 is mixed in this driver circuit, and its level is adjusted by RV210.

(3) Y/C OUT circuit

The Y (luminance) signal for the Y/C OUT is input to the Q214-Q218 75 ohm driver circuit from Q206, and at TP203 a Y signal of 2 Vp-p is output.

Similarly, the chroma signal is input to the Q227-Q231 75 ohm driver circuit from Q226, and at TP206 an 80IRE burst for NTSC model (or 600 mV for PAL model) is output.

The Y level is adjusted at RV202, and the chroma level is adjusted at RV205.

3-3. SG-150 Board

The SG-150 board is composed of the phase comparator in an HD.VD external sync mode, VCO, SYNC generator IC, and DELAYED HD circuits.

(1) SYNC generator, VCO

This unit operates in the following three sync modes:

- Internal sync
- VBS external sync
- HD.VD external sync

In internal sync mode, slight different operation occurs between NTSC system and PAL system.

VCO operation and the condition of terminals in each mode are as shown below.

NTSC

	CL X'tal	CL L • C	4FSC IN	INT/EXT	HV DET
INT	○	×	×	L	H
VBS	○	×	○	H	H
HD • VD	×	○	×	L	L

PAL

INT	○	○	○	L	H
VBS	○	○	○	H	H
HD • VD	×	×	×	L	L

Note: In INT mode of NTSC, the CL IN, which is divided into four by internal switch, is output from SC OUT of IC6 CX-7930.

When HV DET is H, the signal is input to pin 2 of IC7, and pin 3 is set to L, and Q6 is set to ON. Then the power voltage is added to X1, and the unit operates. The level of pin 4 is set to L so that LC VCO does not operate. When HV DET is set to L, Q6 is set to OFF. So X1 does not operate, but LC VCO operates. In this case, from pin 8 of IC7, no signal is output. The CL made here is sent to CX-7930A of IC6 to make sync pulses, and also sent to IC1.

There are three CL frequencies depending upon the model as shown below.

Model	CL frequency
DXC-755/760MD	14.31818 MHz
DXC-755P	14.7500 MHz

The signal is directly input to IC6 from JR5 for the DXC-755 and DXC-760MD; for the DXC-755P, it is input to IC10 CXD1361, and the output signal is input to IC6 because of the aspect ratio of CCD. The aspect ratio of CCD used in the DXC-755P is different from the other ones so that the H pulses are thinned out. This IC stops the CL at the moment of thinning.

(2) HS (DELAYED HD) circuit

This unit is a two-piece camera composed of a camera head and a CCU, and the circuit which aligns the phases of the head and CCU is placed on the SG-198 board. This circuit produces an HS pulse used as a reference pulse. The clock is divided into 8 by IC1, and is input to IC2 as a clock. HD, which is reversed by Q1, is also input to IC2. When the rising of the pulse is delayed by 6 bits of the clock of IC1 from the timing of HD, i.e.

$$70 \text{ ns} \times 8 \times 6 = 3.36 \mu\text{s}$$

an HS pulse is output. Actually, the clock is reset by using the HD pulse in IC1 so that the start of the clock of pin 12 is delayed by a half bit;

$$280 \text{ ns} + 70 \text{ ns} \times 8 \times 6 = 3.64 \mu\text{s}$$

The HS is delayed by about $3.6 \mu\text{s}$ from HD. (The pulse width is calculated by $6.7 \mu\text{s} - 3.64 \mu\text{s} = 3.06 \mu\text{s}$ in case of NTSC.)

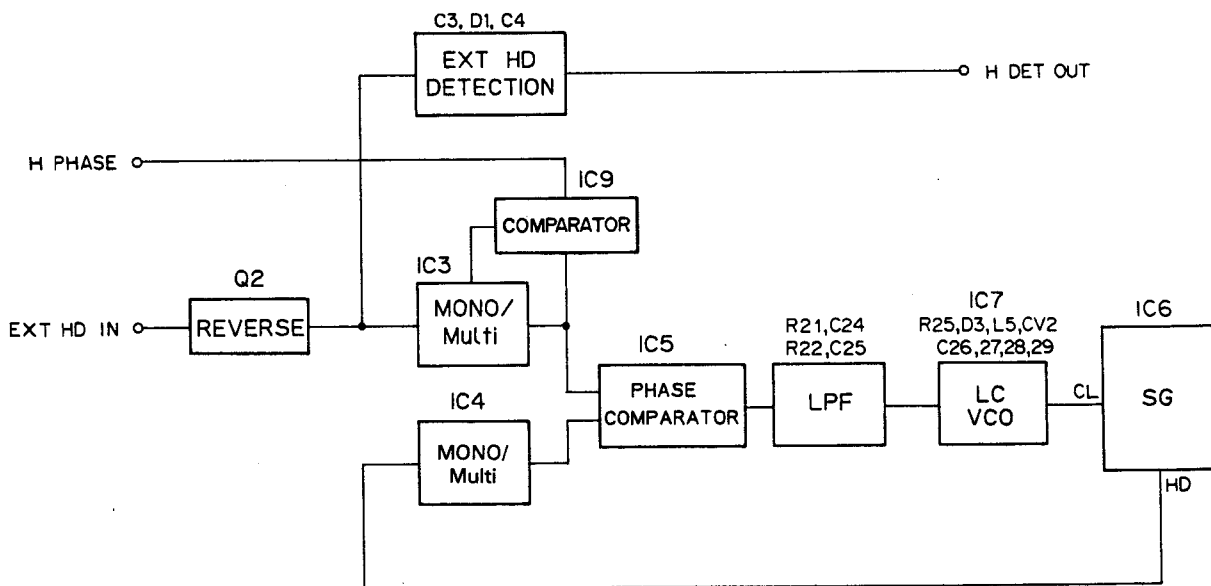
(3) Phase comparator circuit in HD.VD external sync mode

When HD is input from the external equipment, it is reversed by Q2. Then it passes the buffer of Q7, is rectified by D1, and is held by C4. Therefore the H DET OUT becomes H.

The output of Q2 is input to IC3, and the negative pulse is made. The width of this pulse is adjusted by the DC (0 – 5 V) of CN4-1 H PHASE. Then the pulse is fed back by using the OP AMP of IC9 through pin 4 of IC3 to obtain stable temperature characteristics.

HD input from IC6 is reversed by Q4, and input to IC4. The pulse delayed a little from HD is output from IC4 (positive pulse from pin 5).

The end of the pulse of IC3 (rising edge) and the beginning of the pulse of IC4 (rising edge) are compared by the phase comparator of IC5, and the difference is output from pin 13. The output of pin 13 passes the LPF of R21, C24, R22 and C25, and is input to Q5 buffer, then input to LC VCO. The BUF OUT is DC, and the capacity of D3 changes according to the DC level, which changes the generated frequency. The clock made by LC VCO is input to IC6, where HD changes according to the change of the clock. As a result, the phases of two pulses input to IC5 are aligned, i.e., the output of IC6 keeps a constant phase relation with an external HD.



3-4. CHU

<PA board>

As the circuits of the PA-64, 65 and 66 boards are the same, here the PA-64 board only is described. For the PA-65 board, however, some reference numbers are different.

(1) CCD bias section

The vertical register transfer pulse generated in the DR-62 board is sent to pin 1-pin 3 and pin 6 of CCD, the V SUB voltage to pin 4, the VL voltage to pin 7 and pin 17, the +15 V to pin 10 and pin 15, and the PG pulse and the horizontal register transfer pulse to pin 16, pin 18 and pin 19 respectively. At pin 12, a voltage of approximately 2 V which is divided from +15 V is supplied.

(2) PA section

The CCD OUT signal input to the Q1 buffer from pin 11 of CCD is output to two circuits. On the one hand, the signal passes the Q2 buffer, and samples and holds the pre-charge level of the CCD output at Q3. Then it passes the Q4 and Q5 buffer and samples and holds the signal with the same phase as that of the signal. On the other hand, the CCD OUT signal which passed the Q8 buffer (Q11 for the PA-65 board) samples and holds the signal at Q9 (Q12), passes the Q10 (Q16) buffer and is input to the Q11 (Q17) differential amplifier.

Consequently, the difference level caused by the signal level input at Q11 (Q17) and that caused by the pre-charge level input at Q13 (Q19) are amplified, and this becomes the PA OUT signal after passing the Q15 (Q21) buffer. This CDS circuit reduces the reset noise and 1/f noise and contributes to a better signal-to-noise ratio. The gain of the differential amplifier is approximately 3.5 times for R and B, and approximately 2 times for G.

- * As the DXC-755/755P/760MD employs shifting of picture elements, sample-and-hold is performed on the PA-65 board (at Q9 and Q15) with the phase shifted from the signal phase by 1/2 pitch (35 ns), as well as in the above mentioned circuits.

As shifting of picture elements is performed for the G-ch, the PA-65 board contains the S/H circuit (Q9 and Q15) which provides a signal that is phase-shifted from the original signal by 1/2 pitch (35ns).

<TG-108 board>

The TG-108 board is composed of a synchronizing circuit between the CHU and the CCU, CCD drive pulse generating circuit, shutter pulse generating circuit and MONITOR OUT circuit.

The H.pulse (L) input from the CCU is inverted at Q6.

The inverted pulse is input to the Q2 buffer and to pin 45 of IC1. After passing Q2, the pulse is returned to the CCU through pin 4 of CN3. On the other hand, when the H. pulse is input to pin 45 of IC1, the same pulse is output from pin 18. This pulse is compared with the H REF pulse output from pin 20 on the TG-35 board and the corresponding clock (28.5 MHz) is input to pin 32 of IC2. This clock, after being divided into 1/2, is input to pin 4 of IC1 to be used as the clock of IC1. At this step, the H REF pulse referred to the internal HD of IC1 is delayed by approximately 3.85 μ sec.

Since this pulse operates so that the phase matches the H. pulse (H SEP) input from the CCU, the HD output from IC1 is advanced to the H. SEP by 3.85 μ sec.

The VD sent from the CCU is inverted twice at Q5 of IC7 and is input to pin 46 of IC1.

The IC2 is a generator of various CCD drive pulses. The IC selects NTSC/PAL, color/monochrome, field/frame, HD delay, etc. with the ROM of IC5, using the HD and VD from IC1 and the 28.5 MHz clock from the TG-35 board as reference, and outputs the pulses.

The IC3 generates the pulse shifted from the SHD pulse by 1/2 pitch (35 ns) to sample and hold the phase-shifted G-ch signal.

The RV1 is used for fine adjustment of the phase shift.

The IC4 is a shutter pulse generating IC. The VD is input to pin 1, HD to pin 1, XV4 to pin 3, XSG1 to pin 4 and PS to pin 5. The storage time is determined by the low or high state of pins 13, 14 and 15.

The switch S2 selects the shutter speed. Either FL 1/100 or 1/125 can be selected.

(table)

D2	D1	D0	SEC
L	L	H	*1/100
L	H	L	1/250
L	H	H	1/500
H	L	L	1/1000
H	L	H	1/2000
H	H	L	1/4000
H	H	H	1/10000

IC4 Pin 15: D0
Pin 14: D1
Pin 13: D2

* Either FL 1/100 or 1/125 can be selected with S2.

When the electronic shutter is OFF, pin 6 of IC4 is set to LOW and no shutter pulse is output.

The NTSC mode is selected when pin 7 is set to HIGH, and the PAL mode is selected when pin 7 is set to LOW.

When the G signal is sent to the Q3 base from the DR-62 board, the lower end is clipped by the ground potential to eliminate impulsive low levels for the blanking period. The clipped signal is mixed with the sync signal output from pin 48 of IC1 at Q4, and then output from the MONITOR OUT of the CHU.

The switch S1 on the board selects either the field mode or the frame mode.

<TG-35 board>

The H. REF and H. SEP pulses output from IC1 of the TG-108 board are compared on this board. The difference of the pulses passes the source follower of the Q6 LPF composed of R34, R35, C12 and C13, and is input to the C16-C20, R32 and R33 LC oscillator. This controls the frequency to eliminate the phase difference. The frequency is controlled by varying the capacity according to the voltage applied to D2.

<DR-61 board>

The DR-61 board is a horizontal register transfer pulse driving circuit. As the operation of the R, G and B channels is the same, here the circuit for one of the three channels is described.

The XH1 and XH2 pulses sent from the DR-62 board are input to pin 4 and pin 2 of IC respectively. The IC functions as the inverter and the driver and outputs the inverted pulses at pin 5 and pin 7. The pulses are C-cut and low-level clamped by the diode, and then are output to the PA board.

<DR-62 board>

The DR-62 board is composed of a vertical register transfer pulse driving circuit, PA OUT driving circuit and V SUB supply circuit.

(1) Vertical register transfer pulse driving circuit

The IC1 sends the pulse to B channel, and the IC2 sends the pulses to R channel and G channel.

The IC1 and IC2 are inverting drivers. When XV1 is input to pin 19, the inverted pulse is output from pin 2. The power for the inverter is supplied from pin 3. The XSG1 (one pulse to V) input to pin 20 is inverted and output from pin 1. The output pulse is low-level clamped to the DC supplied from the Q1 emitter at D2 and D6, and is input to pin 3.

The V1 OUT is, therefore, approximately +14 V when SG1 is at the present phase, and reads the electric charge from the CCD. Regarding the V3, a similar process is performed. The XSG2 is input to pin 20, and the inverted signal is output from pin 6. The inverted signal is clamped at D2 and D6 and input to pin 8. The V3 output at pin 7 is approximately +14 V at the current phase.

The V2 and V4 are input to pin 18 and pin 15, and output from pin 5 and pin 10 respectively.

The V1, V2, V3 and V4 IC outputs pass the capacitor, are low-level clamped at D3, D4, D7 and D8, pass the DR-61 board, and are sent to the PA board respectively.

The clamping potential used is a peak-rectified pulse of a similar pulse to the V4 (approximately -10V).

The PG pulse is supplied to each PA board by driving the XPG pulse input to pin 20 of CN1 through the Q3 to Q6 inverting driver.

(2) PA driving circuit

As the same circuit is used for three channels, here the R channel only is described.

The PA OUT signal which has passed the DR-61 board and has been input to R56 functions as the amplifier and 75 ohm driver at Q24-Q28.

The gain is $1 + R52/R54 = 2$. When the signal is transmitted from the CHU to CCU through a coaxial cable and terminated at 75 ohms on the CCU, the level is reduced by half. To compensate it, the 75 ohm driver amplifies the level twice.

(3) V SUB supply circuit

As the same circuit is used for three channels, here the R channel only is described.

When the Q13 base potential is to rise, the Q13 corrector potential lowers. Consequently the Q14 emitter potential decreases to lower the Q13 base potential for a constant potential (approximately +5 V). This circuit controls the Q14 emitter (= V SUB) by adjusting the variable resistor (base potential). When operating the electronic shutter, a shutter pulse is input to pin 14 of CN1 from the TG-108 board, and the 29 Vp-p pulse generated by the Q29-Q32 inverting driver is added to each V SUB through the capacitor.

CHAPTER 4

ALIGNMENT

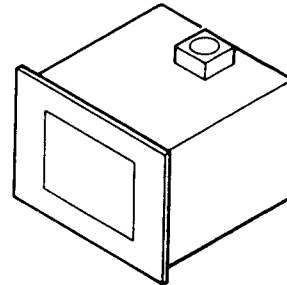
4-1. PREPARATION

4-1-1. Equipment Required

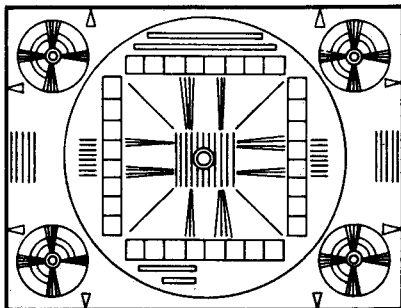
- Oscilloscope (more than 30 MHz)
- Waveform monitor
- Vectorscope
- Black and white monitor (Sony PVM-91/91CE or equivalent)
- Color Monitor (Sony PVM-1320/1320P or equivalent)
- Frequency counter

J-6020-490-A J-6029-140-A	PTB-100 Pattern Box PTB-500 Pattern Box
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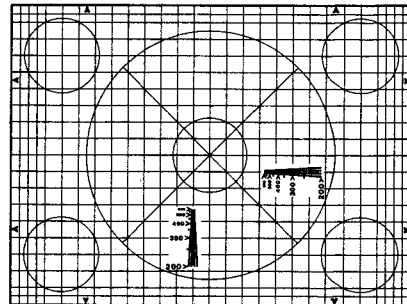
Light source for test chart (90 to 130 VAC: PTB-100)
(90 to 240 VAC: PTB-500)



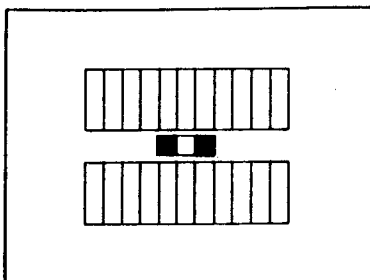
J-6026-100-A	Resolution chart
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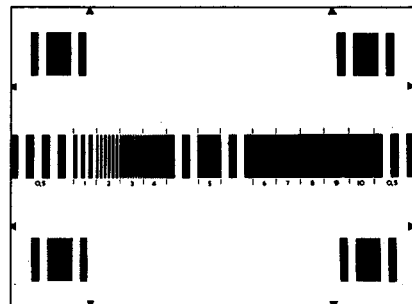
J-6020-120-A	Registration Chart
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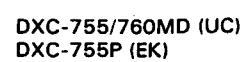


J-6026-130-A	Grayscale chart
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J-6026-110-A	Burst Chart
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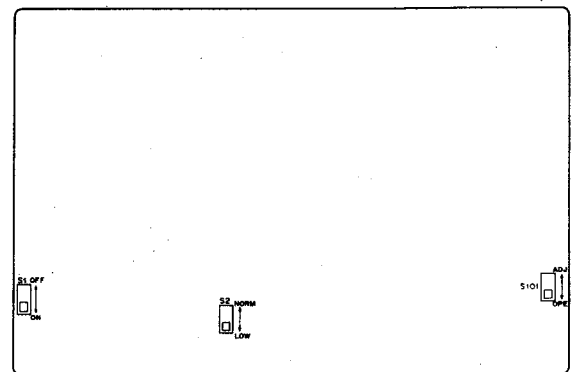
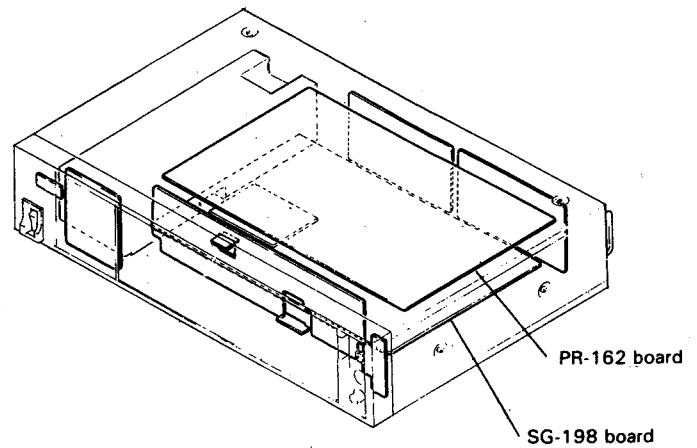




4-1-3. Initial Setting

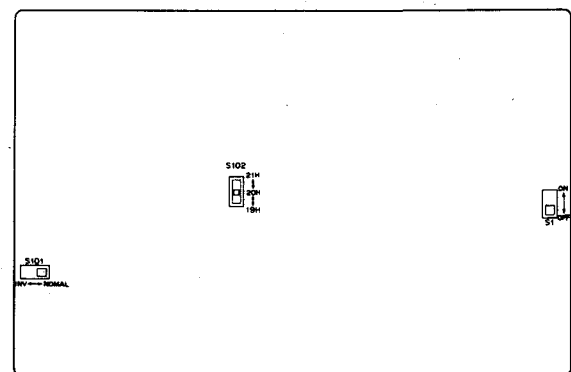
Set the switches and controls as follows.

- FRONT PANEL
 - COLOR TEMP : 3200K
 - W/B BALANCE
 - AUTO/MAN : AUTO
 - GAIN R, B : mechanical center
 - PED R, B : mechanical center
 - GAIN : 0 dB
 - MASTER PED : mechanical center
 - IRIS AUTO/MAN : MAN
 - (control) : mechanical center
 - SHUTTER ON/OFF : OFF
 - MODE : CAM
 - DETAIL : mechanical center
 - PHASE SC 0°/180° : 0°
 - SC, H : mechanical center
 - REAR PANEL
 - RGB SYNC ON/OFF : ON
 - RGB2/COMPONENT : RGB2
 - GAMMA : ON
 - LINEAR MATRIX : OFF
 - GEN LOCK IN 75 Ω $\times$ 3 : ON
 - CABLE COMP : $\sim$ 10
 - PR-162 Board
 - S1 OFF/ON : OFF (DXC-755/755P)
ON (DXC-760MD)
 - S101 ADJ/OPE : ADJ
 - S2 LOW/NORM : NORM
 - SG-198 Board
 - S1 HF DTL : ON
 - S101 FIELD INV : NORMAL
 - S102 V BLKG WIDTH : 20H
- After adjustment, set the switches as follows.
- FRONT PANEL
 - IRIS AUTO/MAN : AUTO
 - REAR PANEL
 - LINEAR MATRIX : ON
 - PR-162 Board
 - S101 ADJ/OPE : OPE
 - S2 NORM/LOW : NORM (DXC-755/755P)
LOW (DXC-760MD)



PR-162 board (component side)

* Note: S2 is mounted on Soldering side.



SG-198 board (component side)

4-2. BEFORE ADJUSTMENT

- Note: 1. Before adjustment, connect the equipments referring to 4-1-2 Connections. And confirm that the following specifications are satisfied.
2. Before adjustment, set the POWER switch to ON and warm up for about 10 minutes.

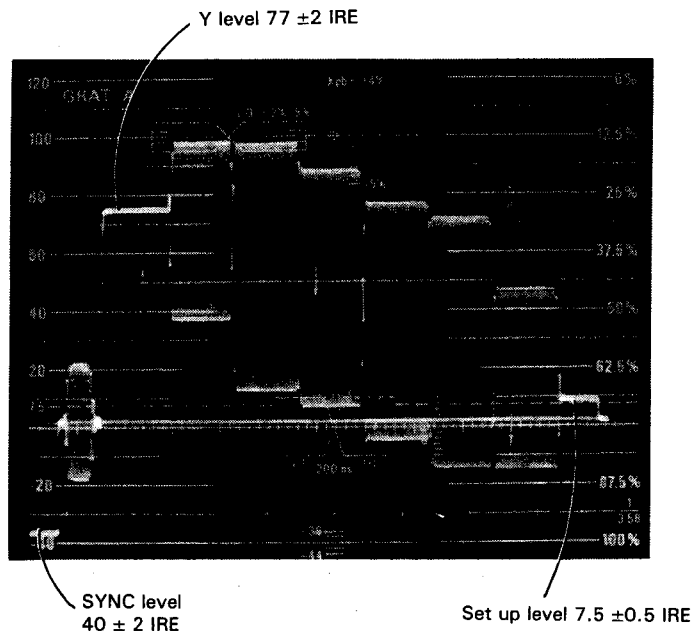
4-2-1. Color Bar Signal

Equipment: Vectorscope, Waveform monitor

Preparation: Set the MODE switch to BARS.

Specifications:

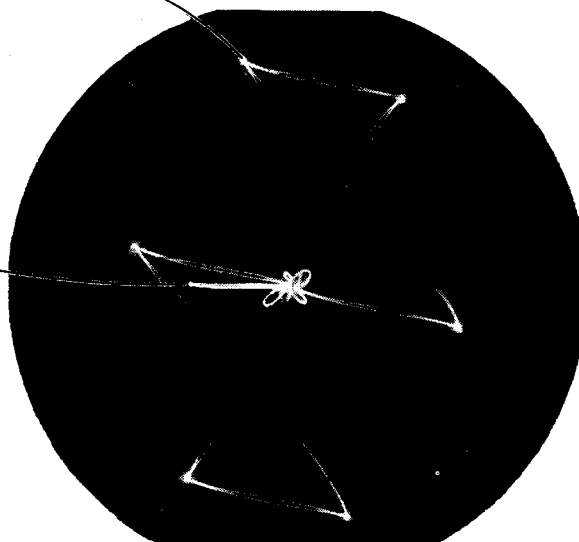
(NTSC)



- Adjust so that the beam spots of each color (R, YL, G, CY, B, and MG) are inside the "田" mark.

Note: Partial difference between scale and signal level is caused by photographic error.

Burst spot 75%

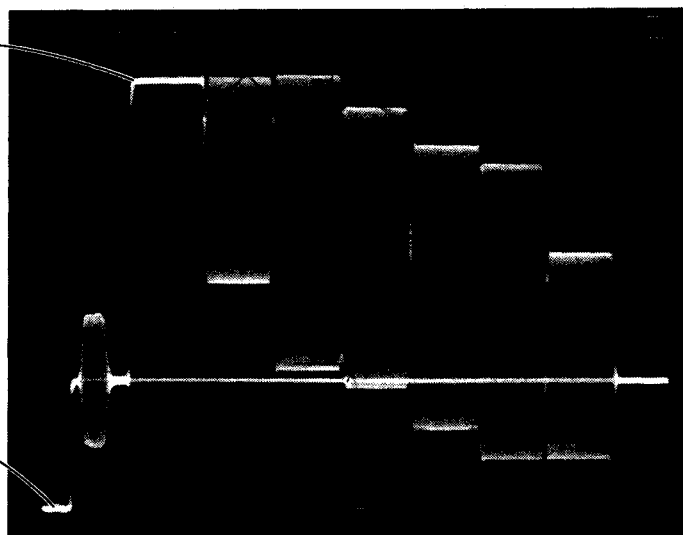


Note: When the specifications are not satisfied, carry out 4-4 ENCODER SYSTEM.

(PAL)

Y level 700 ± 15 mV

SYNC level
 300 ± 15 mV

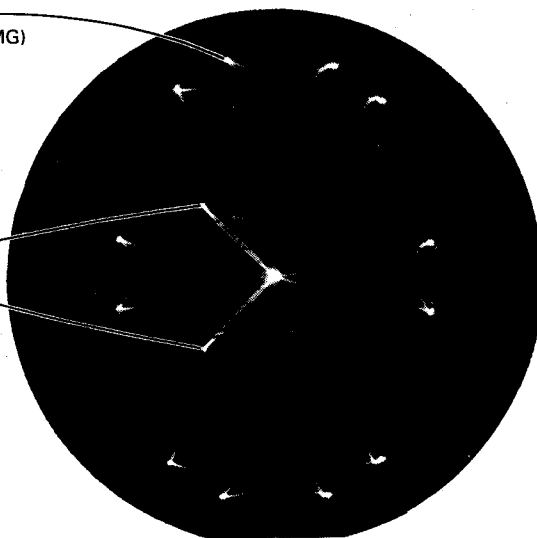


Note: Partial difference between scale and signal level is caused by photographic error.

Chroma level

- Adjust so that the beam spots of each color (R, YL, G, CY, B, and MG) are inside the "田" mark.

Burst spot 75%



Note: When the specifications are not satisfied, carry out
4-4 ENCODER SYSTEM.

4-2-2. Sensitivity Measurement

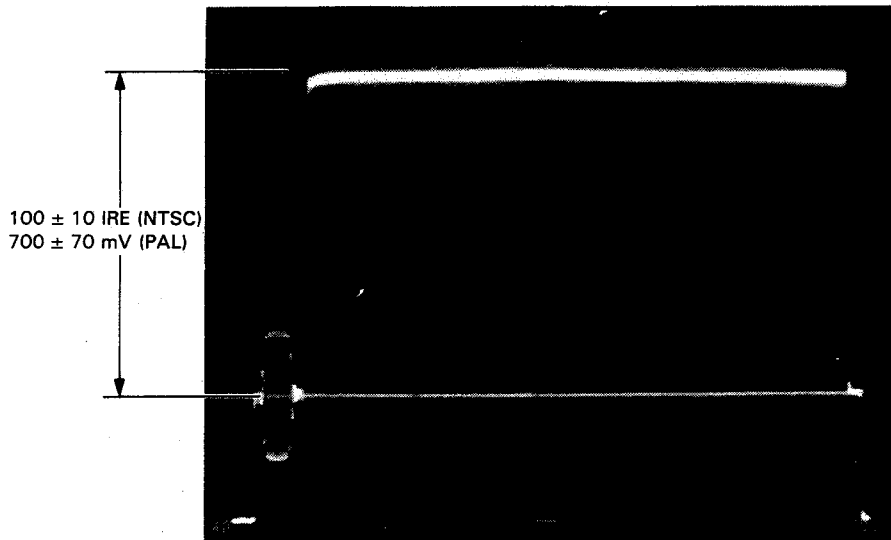
Object: White pattern
Lighting: 3200 K, 2000 lux
(If the pattern box "PTB-100" is used, set the AUTO mode to "706 Nit")

Preparation:

1. Adjust the zoom control at "TELE" so that the white pattern frame touches the underscanned picture frame on the screen.
2. Manually set the iris control to F7.0~8.0 (NTSC)/F5.6~7.0 (PAL)
3. Perform the automatic white balancing.

Equipment: Waveform monitor

Specifications: Adjust so that the white level is 100 ± 10 IRE (NTSC)/ 700 ± 70 mV (PAL).



Note: When the specification is not satisfied, perform all adjustments in 4-5, VIDEO PROCESS SYSTEM.

4-2-4. Resolution Measurement

Object: Resolution chart
(Sony parts number J-6026-100-A)

Light: Pattern box PTB-100/500

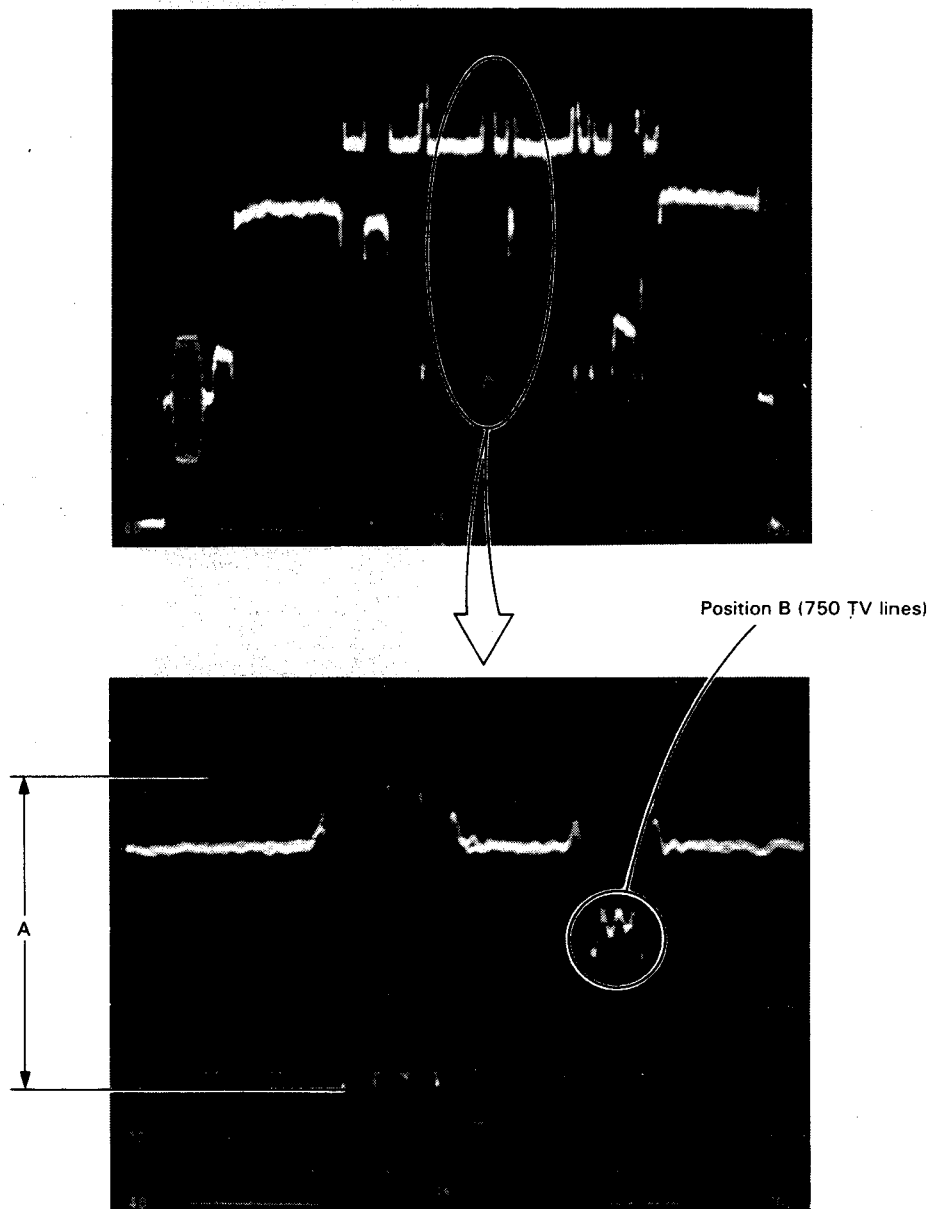
Equipment: Waveform monitor

Preparation:

1. Adjust the zoom control so that the resolution chart frame touches the underscanned frame on the monitor.
2. Adjust the iris control so that the white level of the resolution chart is 80 IRE (NTSC)/560 mV (PAL) on the waveform monitor.
3. Adjust the focus control so that the amplitude "A" of the resolution chart is maximized.
4. Set the "LINE SELECTOR" of the waveform monitor to the 750 TV lines of the resolution chart.

Specification: Four negative peaks corresponding to four black stripes must appear at the 750 TV lines position "B" of the resolution chart on the monitor.

The CCD device has 768 (756) picture elements in the horizontal line. When the vertical black stripes corresponding to 750 TV lines are optically positioned between each element in the CCD, the black stripes do not appear on the monitor. It seems that the resolution has been reduced. In this case, pan the camera slightly so that the best resolution is obtained.



4-3. SYNC SIGNAL SYSTEM

4-3-1. Subcarrier Frequency Adjustment

Equipment: Frequency counter

Test point: TP104 (GND: E102)/SG-198 board

Adjustment point: RV102/SG-198 board

Specification: 3,579,545 Hz $\pm$ 5 Hz (NTSC)
4,433,618 Hz $\pm$ 5 Hz (PAL)

4-3-2. CHU-CCU Phase Adjustment

Equipment: Oscilloscope

Test point: TP108/IC103 pin 3 (GND: E101)/SG-198 board

Adjustment point: RV101/SG-198 board

Specification: 2.6 ± 0.1 V dc

4-4. ENCODER SYSTEM

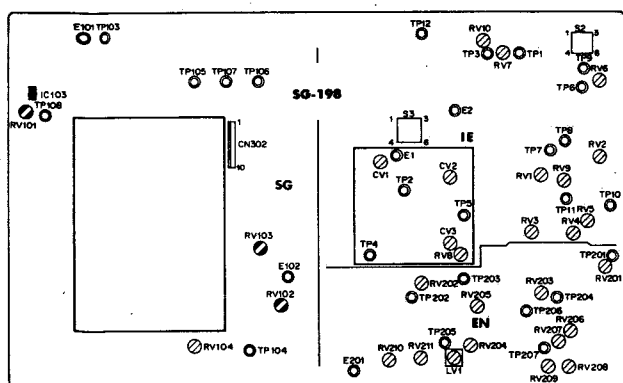
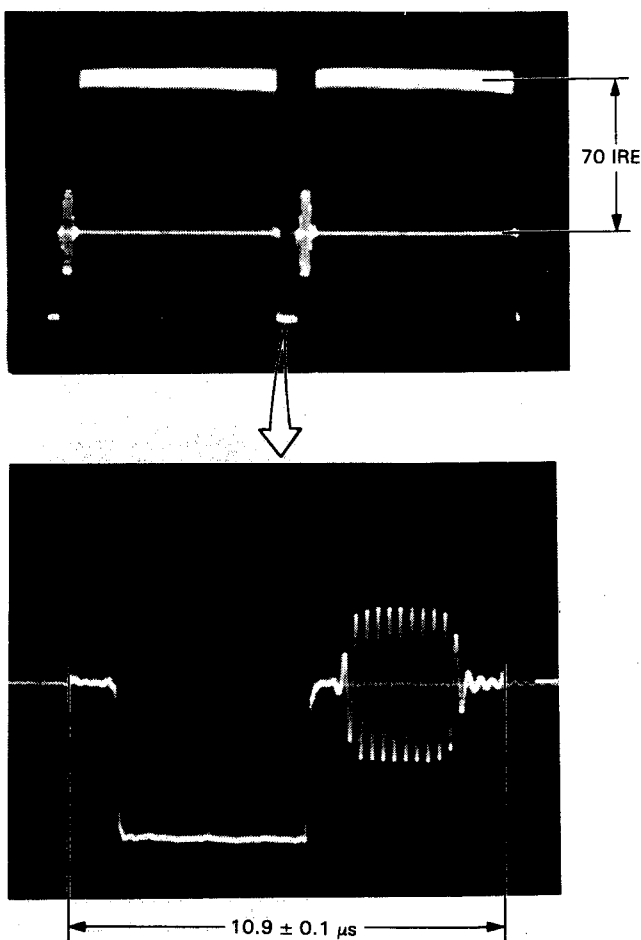
4-4-1. Blanking Pulse Width (only NTSC)

Object: White pattern

Equipment: Waveform monitor

Adjustment:

1. Adjust the zoom control at TELE end so that the white pattern frame touches the underscanned picture frame on the screen.
2. Adjust the iris control so that the white level is 70 IRE.
3. Adjust  RV103/SG-198 board so that blanking pulse width is $10.9 \pm 0.1 \mu\text{s}$.



SG-198 board (component side)

4 ALIGNMENT

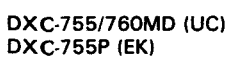
Preparation: Set the MODE switch to BARS.

Trigger: HD (pin 2 of CN302/SG-198 board)

Specification: 1.05 V $\pm$ 0.05 Vp-p (NTSC)

$\chi^2 = 0.000$, $p < .001$

The diagram shows a rectangular sample of length L and thickness h . A voltage V_p is applied across the sample, with the potential difference indicated as $1.4 \pm 0.05 V_{p-p}$. The sample is connected to a circuit with a voltage source and a resistor.



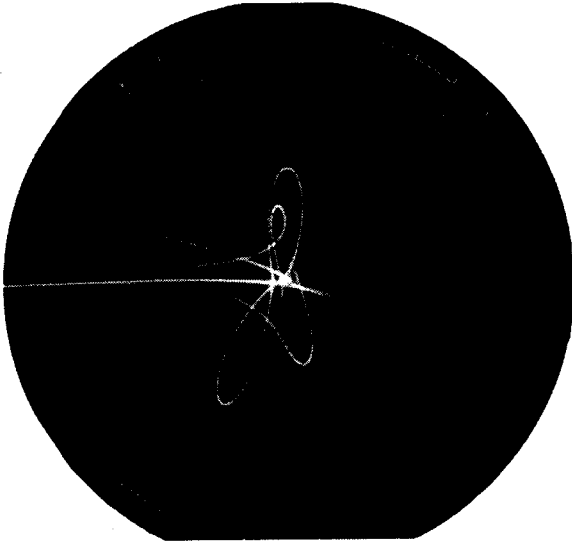
4-4-3. Carrier Balance Adjustment

Equipment: Vectorscope (MAX GAIN)

Preparation: Set the MODE switch to BARS.

Adjustment: Adjust $\odot$ RV203 and $\odot$ RV209/SG-198 board so that the white beam spot is in the center of the vectorscope.

(NTSC)



(PAL)



4-4-4. Y. SYNC and SET UP (NTSC) Level Adjustment

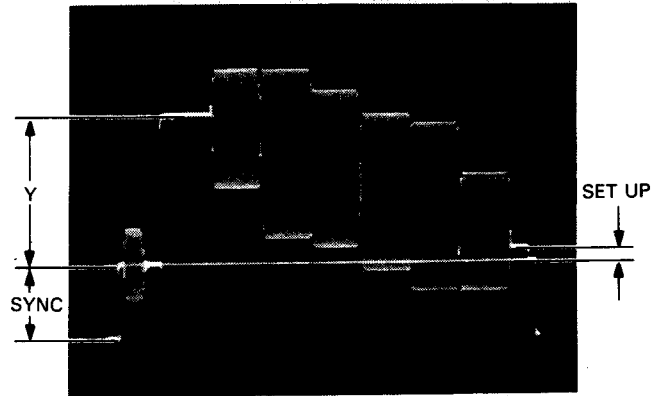
Equipment: Waveform monitor

Preparation: Set the MODE switch to BARS.

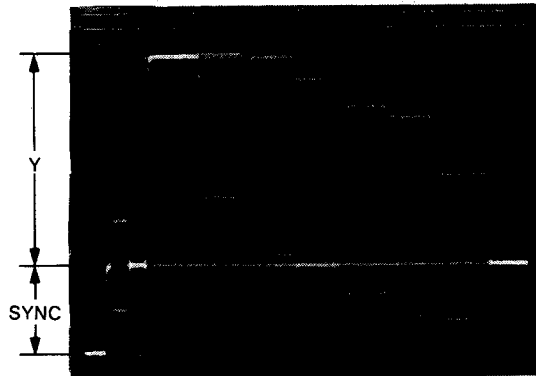
Adjustment:

1. Adjust $\odot$ RV211/SG-198 board so that the SYNC level of the color bars signal is 40 ± 2 IRE (NTSC)/ 300 ± 15 mV (PAL).
2. Adjust $\odot$ RV210/SG-198 board so that the SET UP level of the color bars signal is 7.5 ± 0.5 IRE. (only NTSC)
3. Adjust $\odot$ RV201/SG-198 board so that the Y level of the color bars signal is 77 ± 2 IRE (NTSC)/ 700 ± 15 mV (PAL).

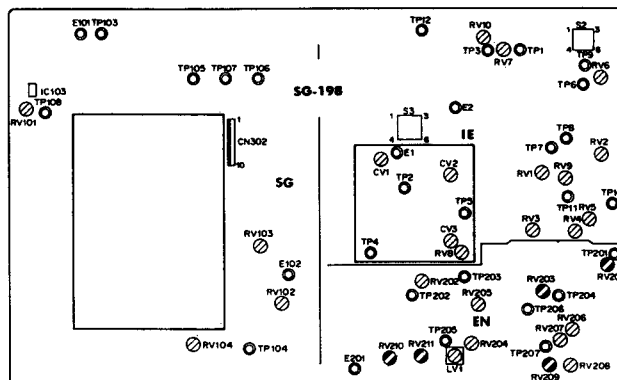
(NTSC)



(PAL)



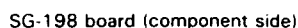
4. Repeat procedures 1 to 3 several times until the specifications are satisfied.



SG-198 board (component side)

DXC-755/760MD (UC)
DXC-755P (EK)

4 ALIGNMENT



Equipment: Oscilloscope

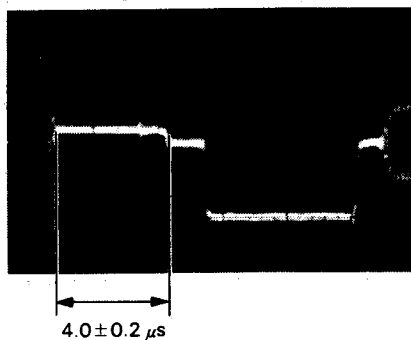
Preparation: Set the MODE switch to BARS.

Test point: VIDEO OUT (BNC)

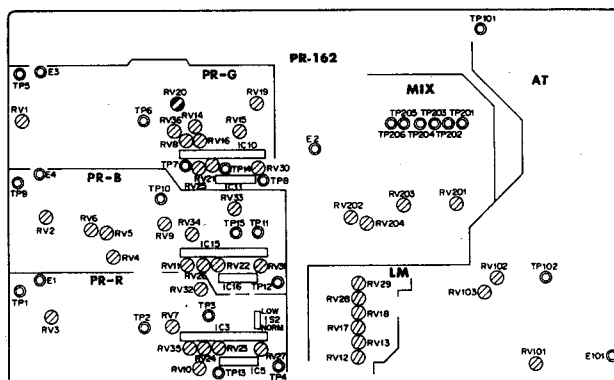
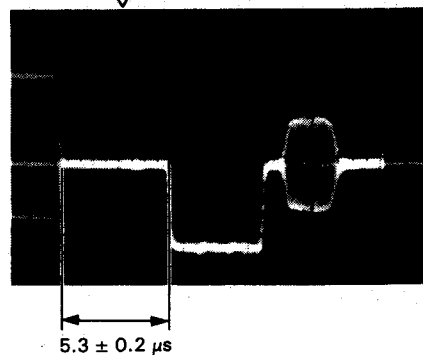
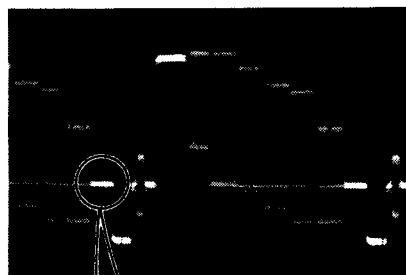
Trigger: HD (pin 2 of CN302/SG-198 board)

Adjustment: Adjust **RV20/PR-162** board so that the black level width of the color bar signal is $4.0 \pm 0.2 \mu s$ (NTSC)/ $5.3 \pm 0.2 \mu s$ (PAL).

(NTSC)



(PAL)



PR-162 board (component side)

4-4-7. RGB-SYNC Level Adjustment

Equipment: Oscilloscope

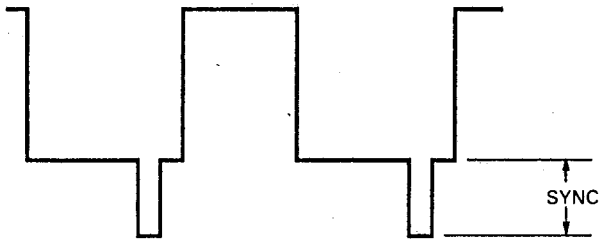
Preparation: Set the MODE switch to BARS.

Test point: TP203 (GND: E2)/PR-162 board

Trigger: HD (pin 2 of CN302/SG-198 board)

Adjustment:

Adjust $\odot$ RV201/PR-162 so that the SYNC level is 570 ± 15 mV (NTSC)/ 600 ± 15 mV (PAL).



4-4-8. Component Y Level Adjustment

Note: Before this adjustment, carry out 4-4-5. Color vector adjustment.

Equipment: Oscilloscope

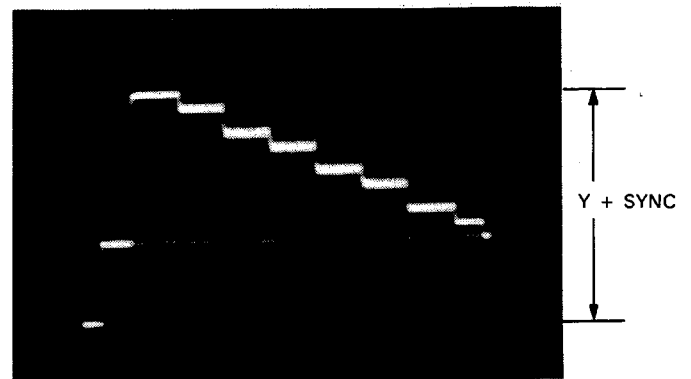
Preparation: Set the MODE switch to BARS.

Set RGB2/COMPONENT switch on the rear panel to COMPONENT.

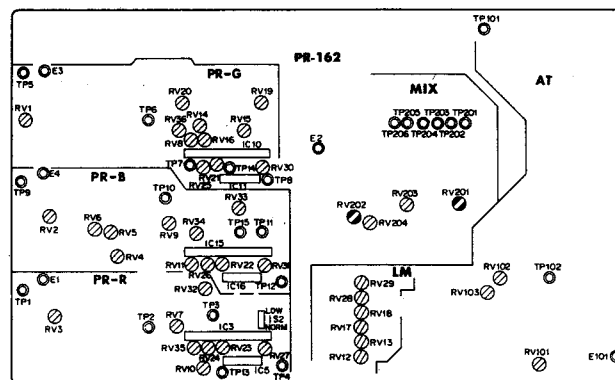
Test point: TP204 (GND: E2)/PR-162 board

Adjustment:

Adjust $\odot$ RV202/PR-162 board so that the white level of Y + SYNC signal is 1.67 V ± 20 mV (NTSC)/ 2 V ± 20 mV (PAL).



4. ALIGNMENT |||||



PR-162 board (component side)

4-4-9. Component B-Y Level Adjustment

Note: Before this adjustment, carry out 4-4-5. Color vector adjustment.

Equipment: Oscilloscope

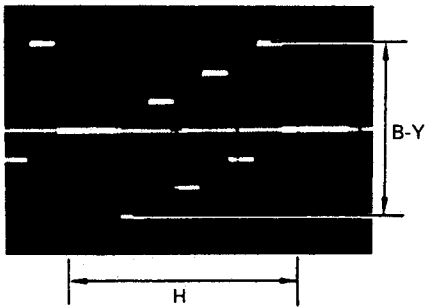
Preparation: Set the MODE switch to BARS.

Set the RGB2/COMPONENT switch on the rear panel to COMPONENT.

Test point: TP206 (GND: E2)/PR-162 board

Adjustment:

Adjust RV204 /PR-162 board so that the B-Y level is $1.4 \text{ V} \pm 30 \text{ mVp-p}$ (NTSC)/ $1.05 \text{ V} \pm 30 \text{ mV}$ (PAL).



4-4-10. Component R-Y Level Adjustment

Note: Before this adjustment, carry out 4-4-5. Color vector adjustment.

Equipment: Oscilloscope

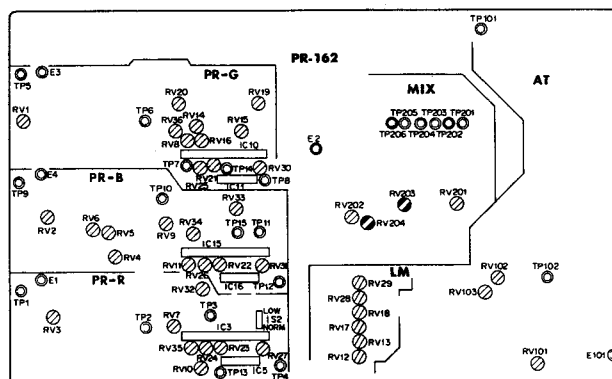
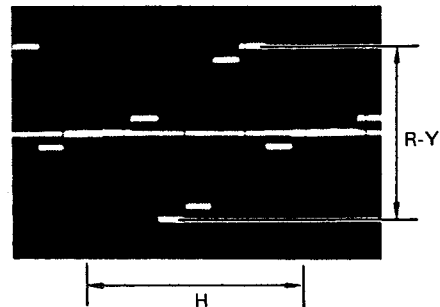
Preparation: Set the MODE switch to BARS.

Set the RGB2/COMPONENT switch on the rear panel to COMPONENT.

Test point: TP202 (GND: E2)/PR-162 board

Adjustment:

Adjust RV203 /PR-162 board so that the R-Y level is $1.4 \text{ V} \pm 30 \text{ mVp-p}$ (NTSC)/ $1.05 \text{ V} \pm 30 \text{ mV}$ (PAL).



PR-162 board (component side)

4-4-11. S-VHS VTR-Y Level Adjustment

Note: Before this adjustment, carry out 4-4-5. Color vector adjustment.

Equipment: Oscilloscope

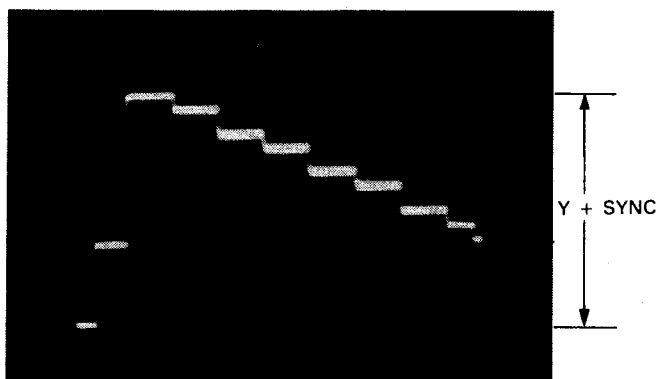
Preparation: Set the MODE switch to BARS.

Test point: TP203 (GND: E201)/SG-198 board

Trigger: HD (pin 2 of CN302/SG-198 board)

Adjustment:

Adjust $\odot$ RV202/SG-198 board so that the white level of Y + SYNC signal is $1.67 \text{ V} \pm 20 \text{ mV}$ (NTSC)/ $2.0 \text{ V} \pm 20 \text{ mV}$ (PAL).



4-4-12. S-VHS VTR-Chroma Level Adjustment

Note: Before this adjustment, carry out 4-4-5. Color vector adjustment.

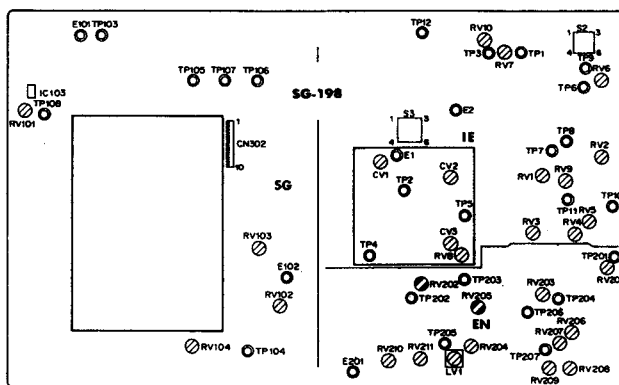
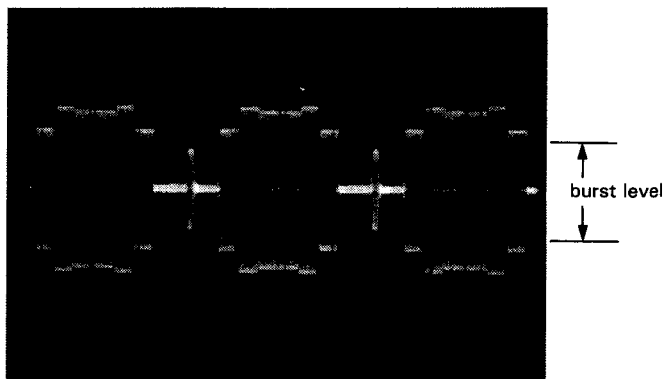
Equipment: Oscilloscope

Preparation: Set the MODE switch to BARS.

Test point: TP206 (GND: E201)/SG-198 board

Adjustment:

Adjust $\odot$ RV205/SG-198 board so that the burst level in the chroma signal is $570 \pm 10 \text{ mVp-p}$ (NTSC)/ $600 \pm 10 \text{ mVp-p}$ (PAL).



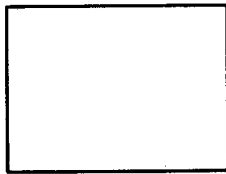
SG-198 board (component side)

4-5. VIDEO PROCESS SYSTEM

4-5-1. IE•AGC Gain Adjustment

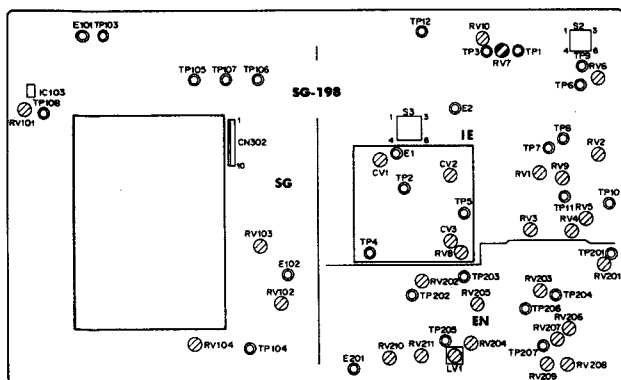
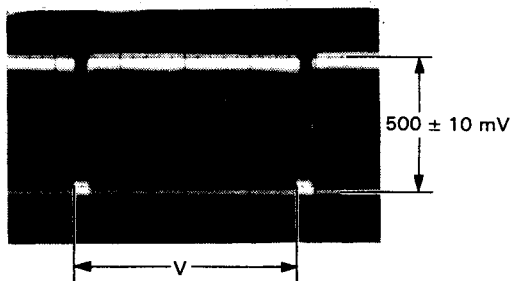
Object: White pattern
Equipment: Oscilloscope
Trigger: VD (pin 1 of CN302/SG-198 board)
Adjustment:

1. Adjust the zoom control so that the white pattern frame touches the underscanned picture frame on the monitor.



Monitor screen

2. Set the lens iris so that the video level at TP1/SG-198 board is 500 ± 10 mV.
3. Adjust the  RV7/SG-198 board so that the video level at TP3/SG-198 board is $500 \text{ mV} \pm 10 \text{ mV}$.

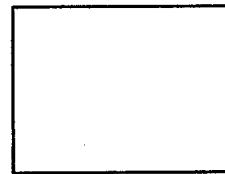


SG-198 board (component side)

4-5-2. G CH Video Level Adjustment

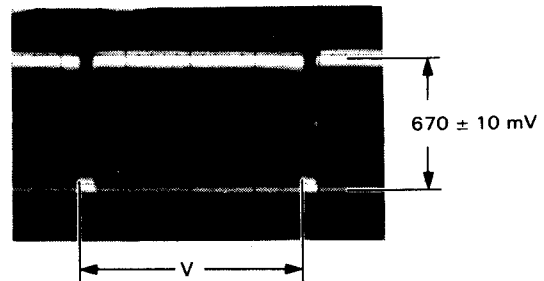
Object: White pattern
Equipment: Oscilloscope
Test point: TP5 (GND: E3)/PR-162 board (connect a 10 k Ω -resistor between the oscilloscope probe and TP5)
Trigger: VD (pin 1 of CN302/SG-198 board)
Adjustment:

1. Adjust the zoom control so that the white pattern frame touches the underscanned picture frame on the screen.

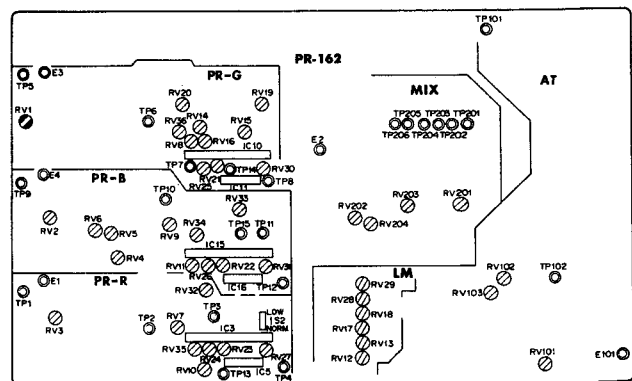


Monitor screen

2. Set the lens iris so that the video level at TP5/PR-162 board is 300 ± 5 mV.
3. Adjust RV1/PR-162 board so that the video level at TP7/PR-162 board is $670 \text{ mV} \pm 10 \text{ mV}$.



Note: Carry out this adjustment through 4-5-4. Reach video level adjustment with the lens iris set in procedure 2.



PR-162 board (component side)

4-5-3. B CH Video Level and Pre-gain Adjustment

Note: Be sure to carry out 4-5-2. G ch video level adjustment before this adjustment.

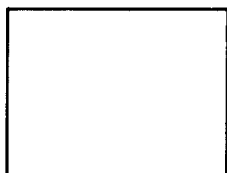
Object: White pattern

Equipment: Oscilloscope

Trigger: VD (pin 1 of CN302/SG-198 board)

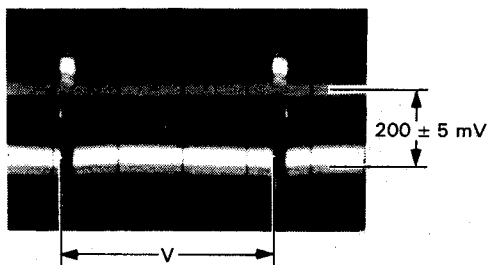
Adjustment:

1. Adjust the zoom control so that the white pattern frame touches the underscanned picture frame on the monitor.

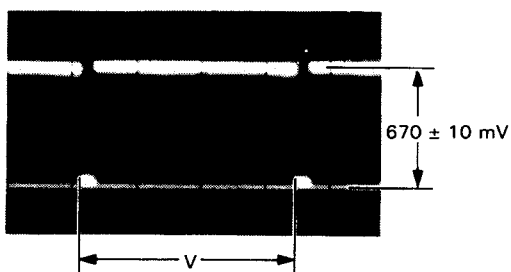


Monitor screen

2. Adjust RV2/PR-162 board so that the video level at TP 10 on the PR-162 board is 200 ± 5 mV.



3. Adjust RV9/PR-162 board so that video level at TP11/PR-162 board is 670 ± 10 mV.



4-5-4. R CH Video Level and Pre-gain Adjustment

Note: Be sure to carry out 4-5-3. B ch level adjustment before this adjustment.

Object: White pattern

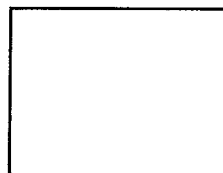
Equipment: Oscilloscope

Test point: TP2 (GND;E1)/PR-162 board

Trigger: VD (pin 1 of CN302/SG-198 board)

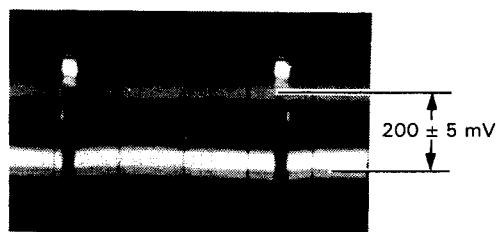
Adjustment:

1. Adjust the zoom control so that the white pattern frame touches the underscanned picture frame on the screen.

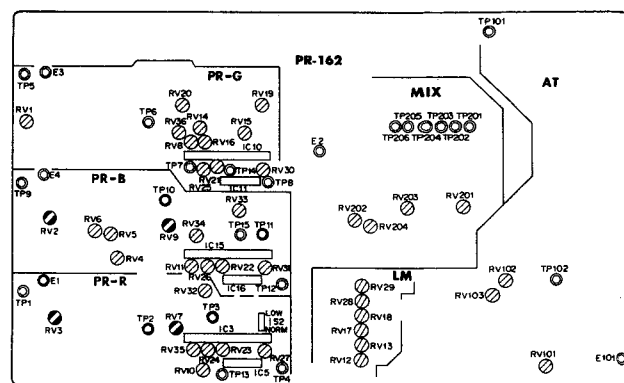
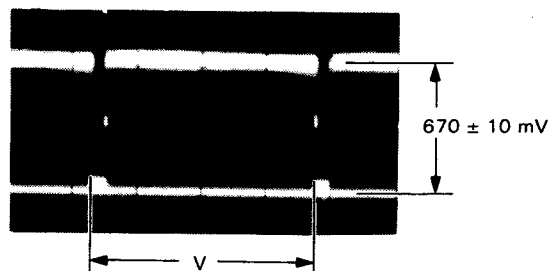


Monitor screen

2. Adjust RV3/PR-162 board so that the video level at TP 2/PR-162 board is 200 ± 5 mV.



3. Adjust RV7/PR-162 board so that the video level at TP 3/PR-162 board is 670 ± 10 mV.



PR-162 board (component side)

4-5-5. Gap Compensation Adjustment

Lens iris: Close "C"

Equipment: Oscilloscope

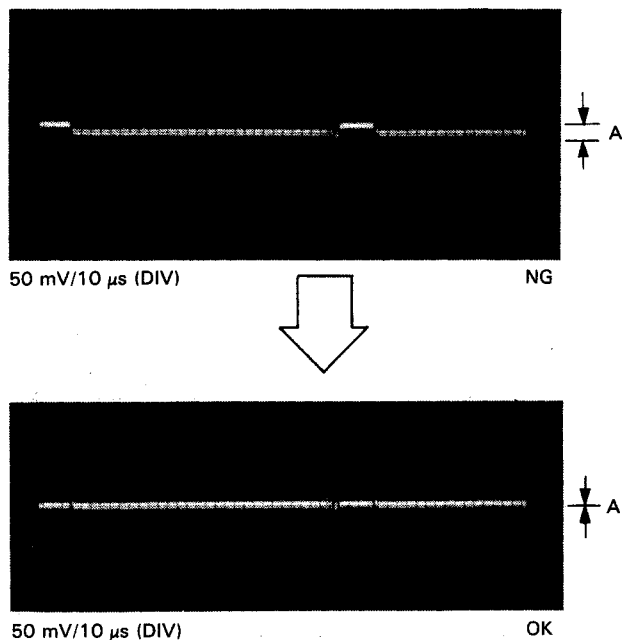
Preparation: Rotate the DETAIL knob on the front panel fully clockwise $\odot$.

Test point: TP 9 (GND: E2)/SG-198 board

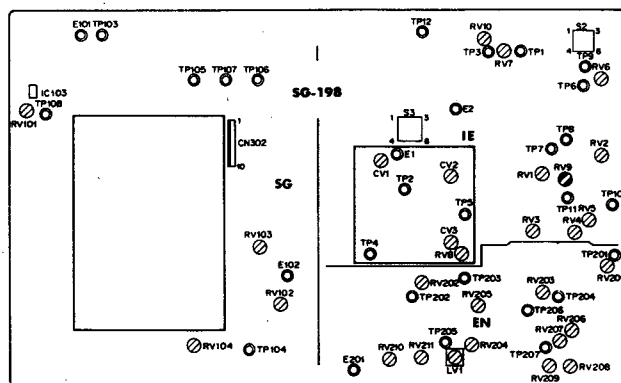
Trigger: HD (pin 2 of CN302/SG-198 board)

Adjustment:

1. Adjust $\odot$ RV9/SG-198 board so that the level "A" is minimized less than 10 mV.



Note: After adjustment, set the DETAIL knob to its mechanical center.



SG-198 board (component side)

4-5-6. Black Set and Pedestal Adjustments

Lens iris: Close "C"

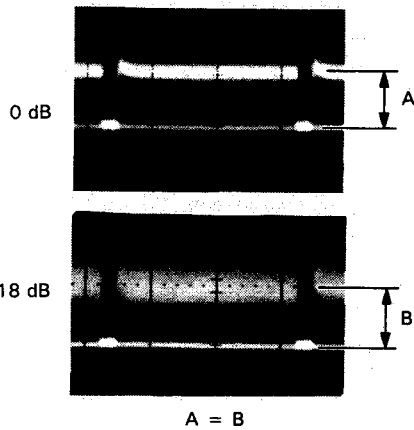
Equipment: Oscilloscope, Vectorscope (MAX GAIN)

Test point: TP 8 (GND: E2)/PR-162 board (Connect a 10 k Ω -resistor between the oscilloscope probe and TP 8)

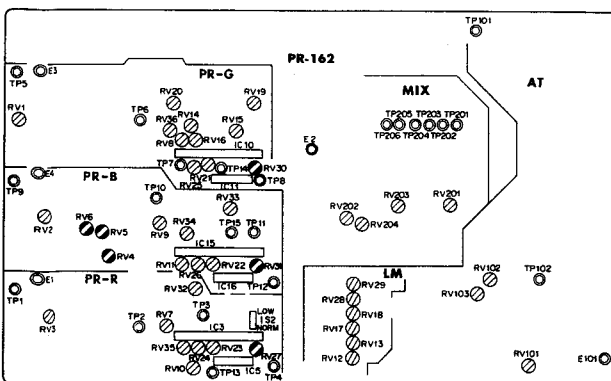
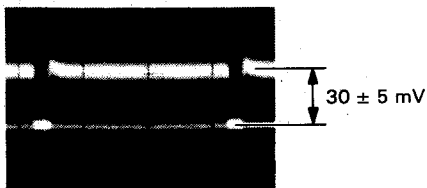
Trigger: VD (pin 1 of CN302/SG-198 board)

Adjustment:

1. Adjust RV5 /PR-162 board so that pedestal level does not change when the GAIN switch on the front panel is switched over from 0 dB to 18 dB.

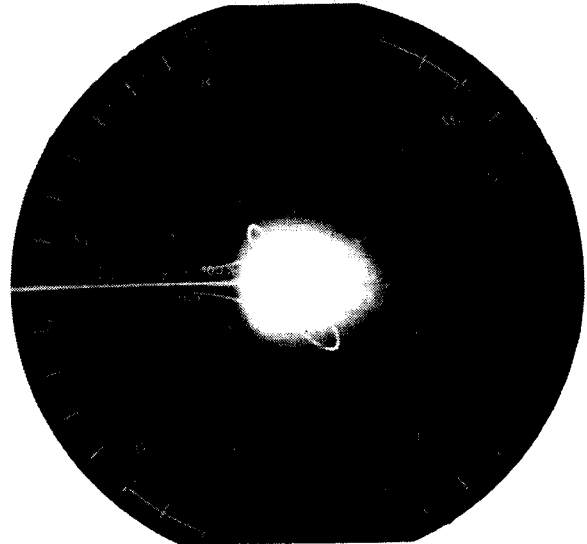


2. Set the GAIN switch on the front panel to 0 dB.
3. Adjust RV30 /PR-162 board so that the pedestal level is 30 ± 5 mV.

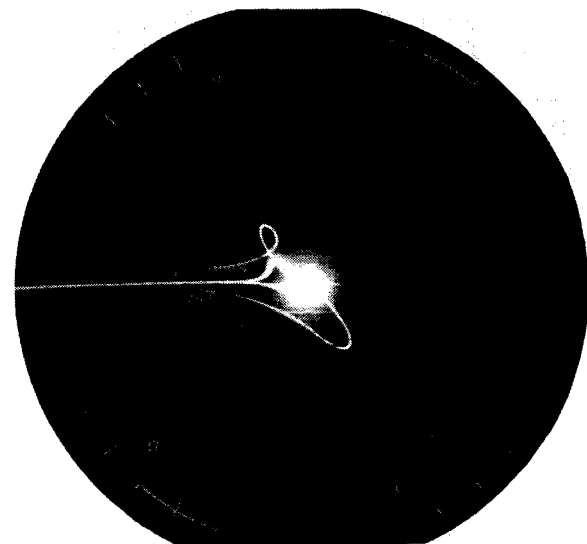


PR-162 board (component side)

4. Set the GAIN switch on the front panel to 18 dB.
5. Adjust RV4 and RV6 /PR-162 board so that the beam spot is in the center of the vectorscope.



6. Set the GAIN switch on the front panel to 0 dB.
7. Adjust RV27 and RV31 /PR-162 board so that the beam spot is in the center of vectorscope.



8. Repeat procedures 4 through 7 several times.
9. Set the GAIN switch on the front panel to 0 dB.

4-5-7. G CH Gamma Balance and Gamma Set Adjustment

Object: Grayscale chart

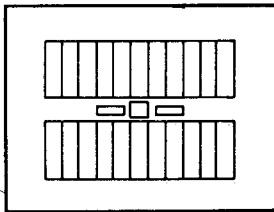
Equipment: Oscilloscope

Test point: TP 8 (GND: E3)/PR-162 board

Trigger: HD (pin 2 of CN302/SG-198 board)

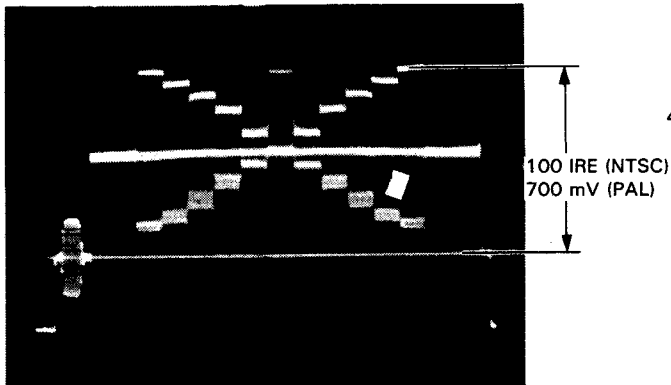
Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.

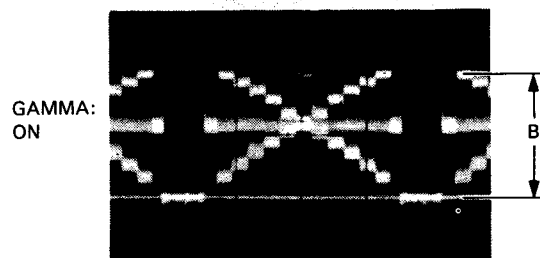
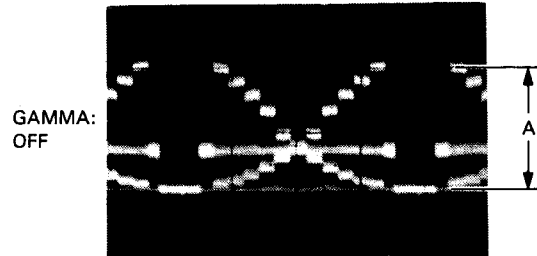


Monitor screen

2. Adjust the iris control so that the video level is 100 IRE (NTSC)/700 mV (PAL) on the waveform monitor.

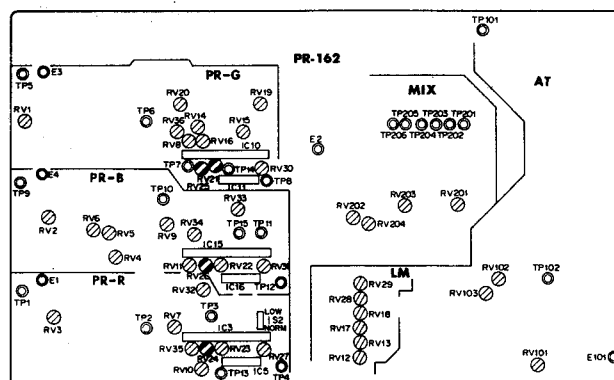
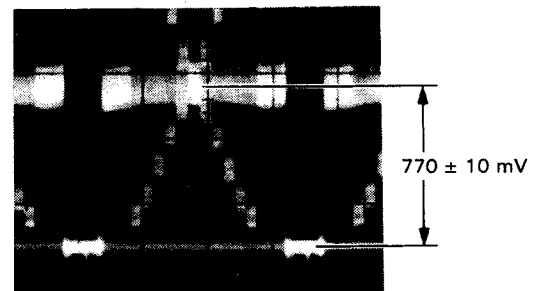


3. Adjust RV25/PR-162 board so that the white level of the video signal does not change when GAMMA switch on the rear panel is turned either ON or OFF.



$$A = B$$

4. Adjust RV21/PR-162 board so that the crosspoint level of the video signal is 770 mV $\pm$ 10 mV.

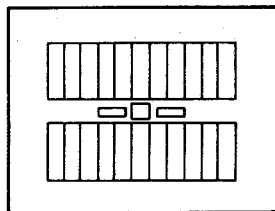


PR-162 board (component side)

4-5-8. R CH Gamma Balance Adjustment

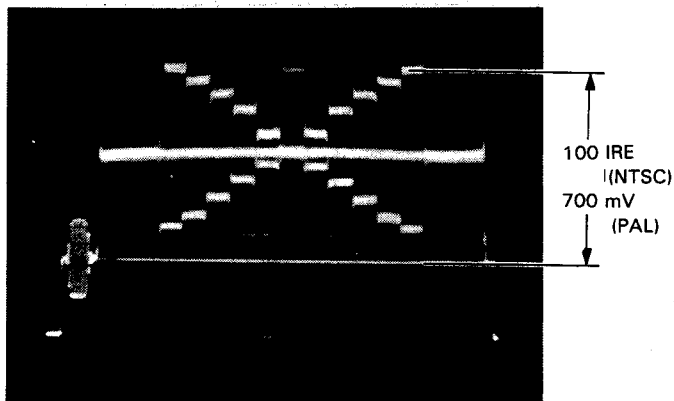
Object: Grayscale chart
 Equipment: Oscilloscope
 Test point: TP 4 (GND: E1)/PR-162 board
 Trigger: HD (pin 2 of CN302/SG-198 board)
 Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.

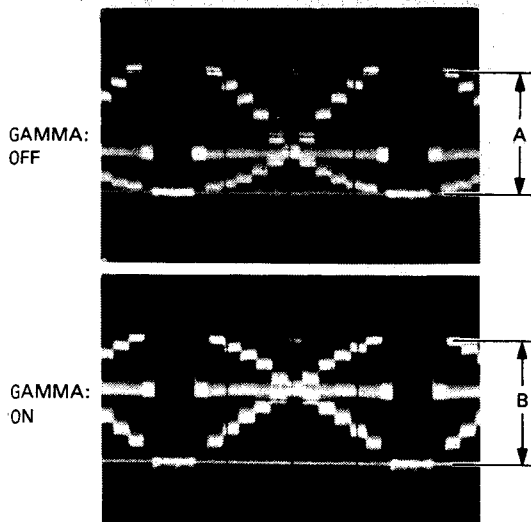


Monitor screen

2. Adjust the iris control so that the white level is 100 IRE (NTSC)/700 mV (PAL) on the waveform monitor.



3. Adjust RV24/PR-162 board so that the white level of the video signal at TP 4/PR-162 board does not change when GAMMA switch on the rear panel is turned either ON or OFF.



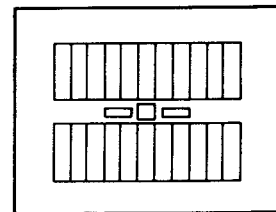
DXC-755/760MD (UC)
 DXC-755P (EK)

A=B

4-5-9. B CH Gamma Balance Adjustment

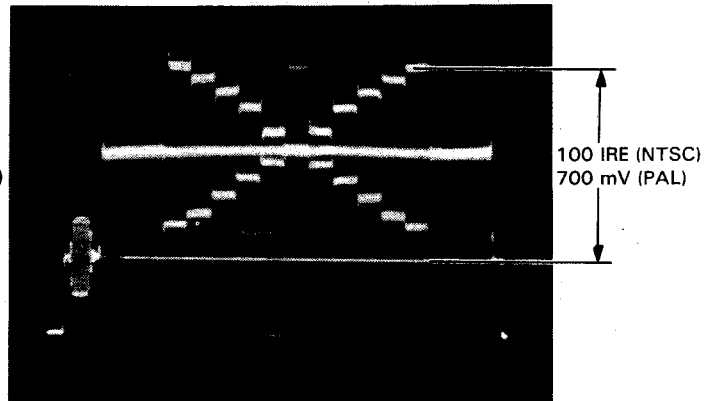
Object: Grayscale chart
 Equipment: Oscilloscope
 Test point: TP 12 (GND: E4)/PR-162 board
 Trigger: HD (pin 2 of CN302/SG-198 board)
 Adjustment:

1. Adjust the zoom control so that the Grayscale chart frame touches the underscanned picture frame on the monitor.

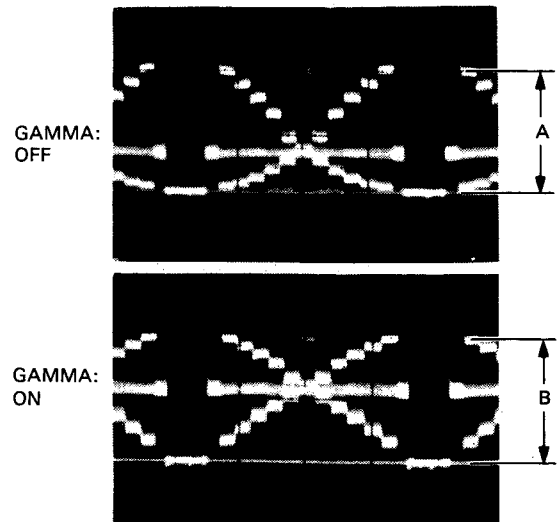


Monitor screen

2. Adjust the iris control so that the white level is 100 IRE (NTSC)/700 mV (PAL) on the waveform monitor.



3. Adjust RV26/PR-162 board so that the white level of the video signal at TP12/PR-162 board does not change when GAMMA switch on the rear panel is turned either ON or OFF.



A=B

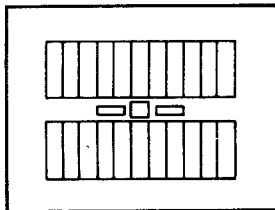
4-5-10. R/B CH Gamma Set and Preset Adjustment

Object: Grayscale chart

Equipment: Waveform monitor, Vectorscope (MAX GAIN)

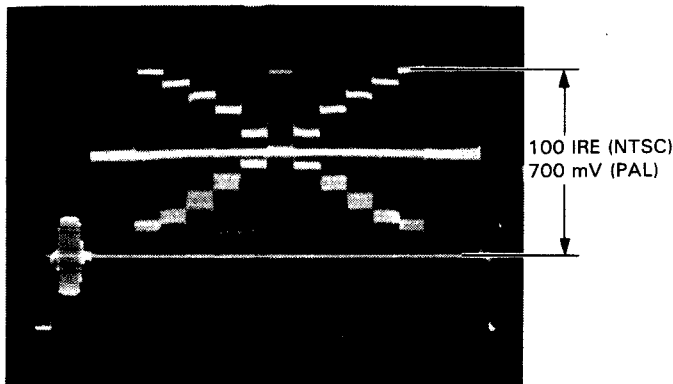
Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.



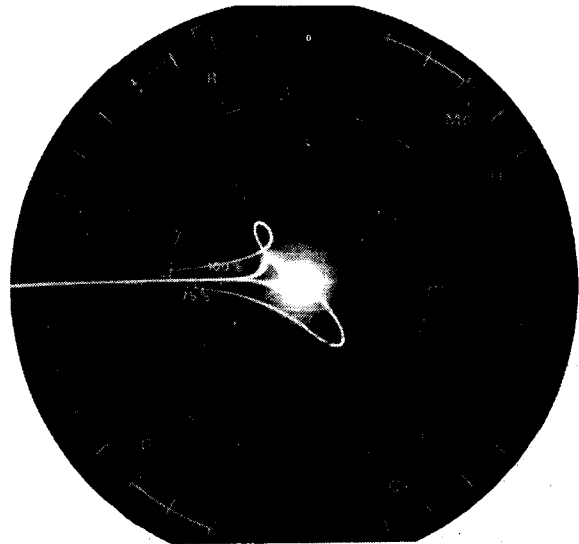
Monitor screen

2. Adjust the iris control so that the video level is 100 IRE (NTSC)/700 mV (PAL) on the waveform monitor.



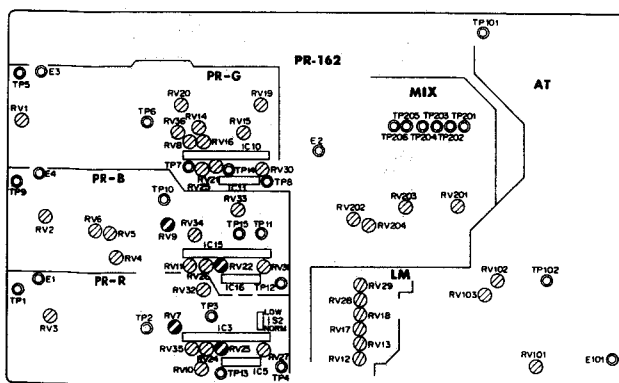
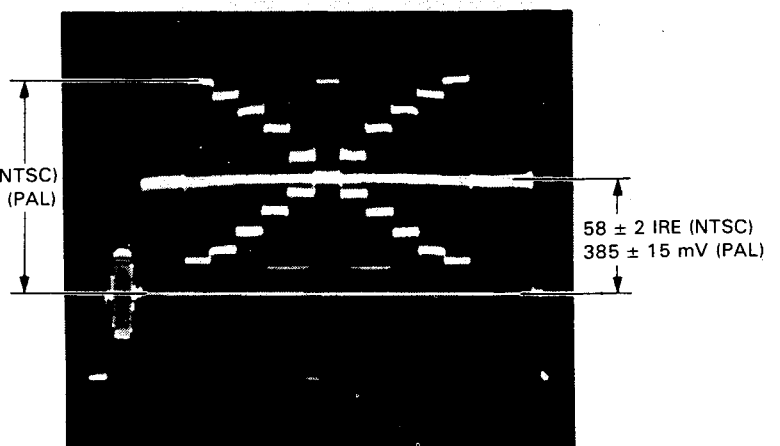
3.
 - RV 7 (R GAIN)
 - RV 9 (B GAIN)
 - RV 23 (R_y ADJ)
 - RV 22 (B_y ADJ) /PR-162 board

Alternately adjust the above four controls several times so that the beam spot is in the center of vectorscope.



4. After the adjustment, the following specifications must be satisfied.
If not, perform from 4-5-2. G ch video level adjustment once more.

100 ± 2 IRE (NTSC)
700 ± 15 mV (PAL)

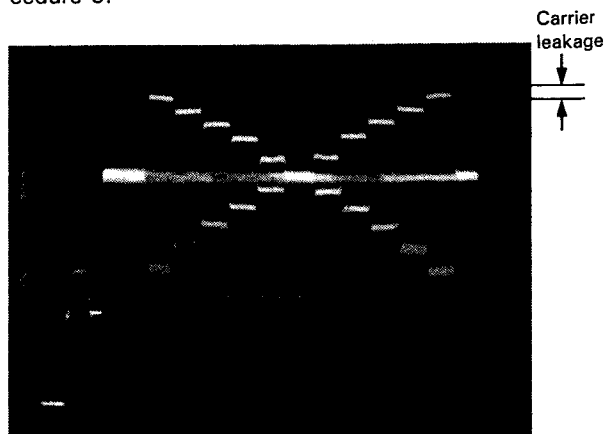


PR-162 board (component side)

4. ALIGNMENT

Monitor screen

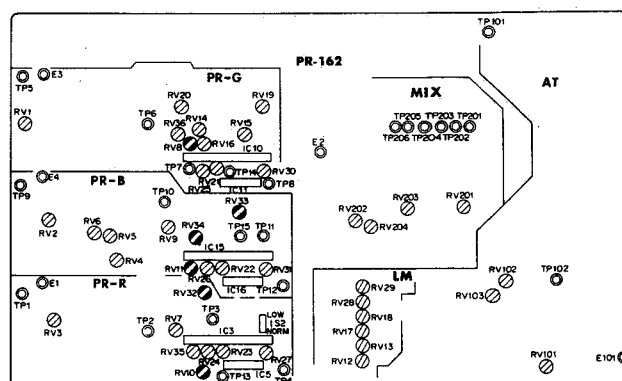
9. Adjust **RV33/PR-162** board so that the white peak level starts to drop.
10. Set the white level to 100 IRE with the iris control.
11. Adjust **RV32** and **RV34/PR-162** board so that the carrier leakage of the white peak is minimized less than 3 IRE (NTSC)/20 mV (PAL) as shown in procedure 6.



- Carrier leakage

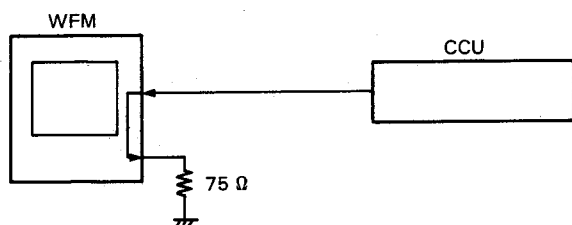
-

Carrier leakage



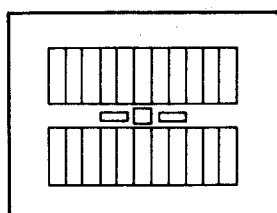
4-23

Object: Grayscale chart
Equipment: Waveform monitor
Preparation: Connect the CCU and the waveform monitor as illustrated.



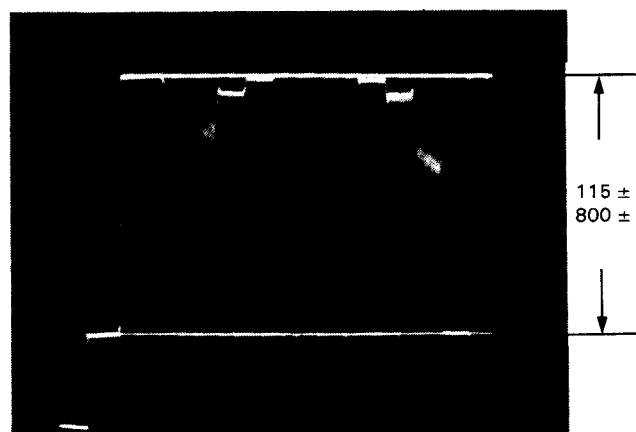
Adjustment:

1. Adjust the zoom control so that grayscale chart frame touches the underscanned picture frame on the monitor.

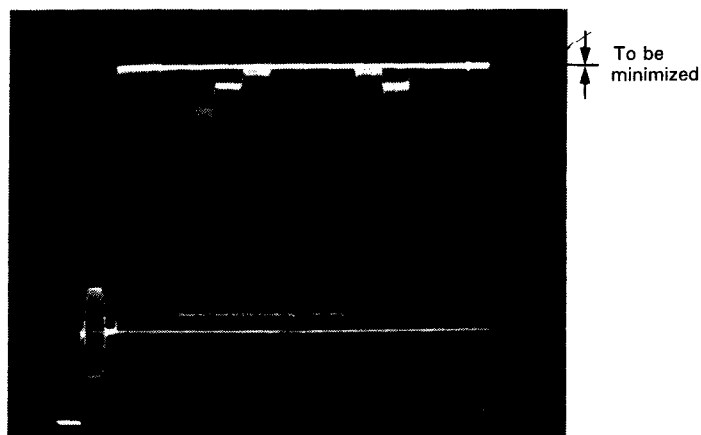
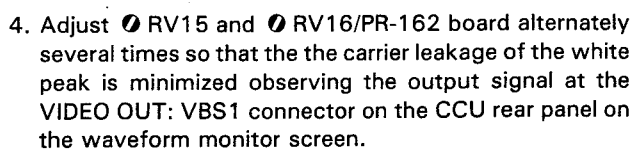


Monitor screen

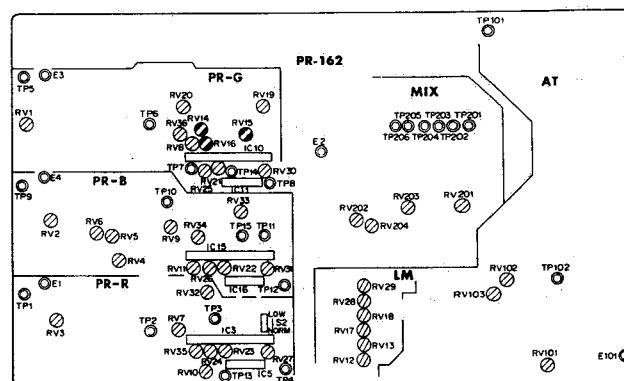
2. Open the lens iris.
3. Adjust  RV14/PR-162 board so that the white peak level is 115 ± 2 IRE (NTSC)/ 800 ± 15 mV (PAL) on the waveform monitor observing the output signal at the RGB1: G connector on the CCU rear panel on the waveform monitor screen.



115 ± 2 IRE (NTSC)
800 ± 15 mV (PAL)



Note: After the adjustment, reconnect the set and measuring equipments as shown in 4-1-2 Connections.



PR-162 board (component side)

4 ALIGNMENT

- CV2 ● CV3 (Step 4-6-1)
- CV1 (Step 4-6-2)
- RV4 (Step 4-6-4)

4 ALIGNMENT

4 ALIGNMENT

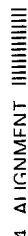
4 ALIGNMENT

4 ALIGNMENT

4 ALIGNMENT

4 ALIGNMENT

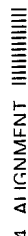
4 ALIGNMENT



4 ALIGNMENT

4 ALIGNMENT

4 ALIGNMENT



4 ALIGNMENT

4 ALIGNMENT

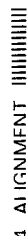
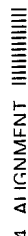
4 ALIGNMENT

4 ALIGNMENT

4 ALIGNMENT

4 ALIGNMENT

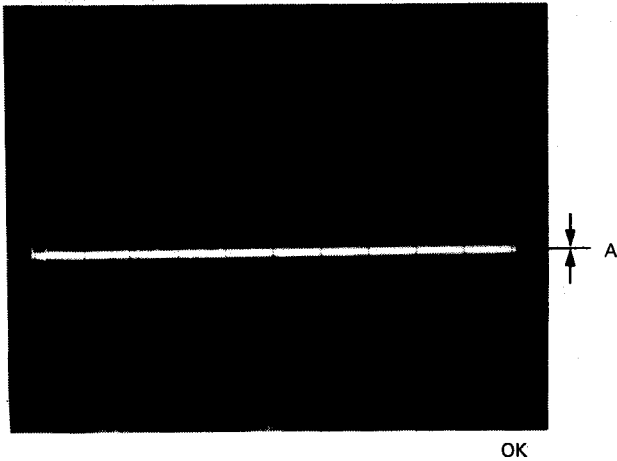
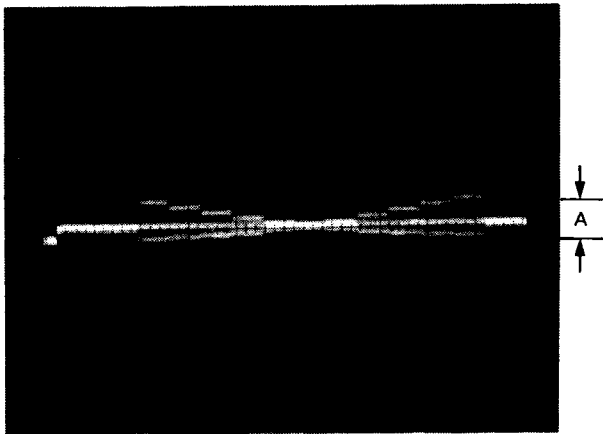
4 ALIGNMENT



4 ALIGNMENT

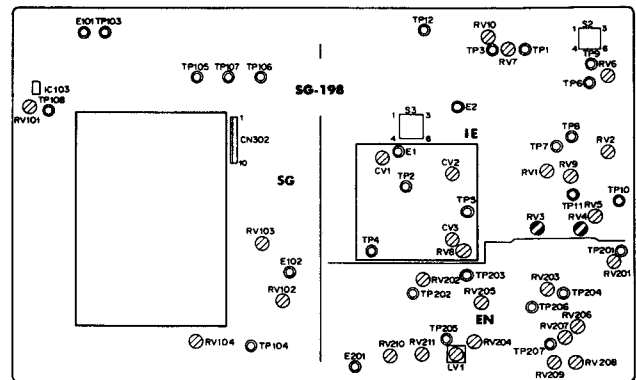
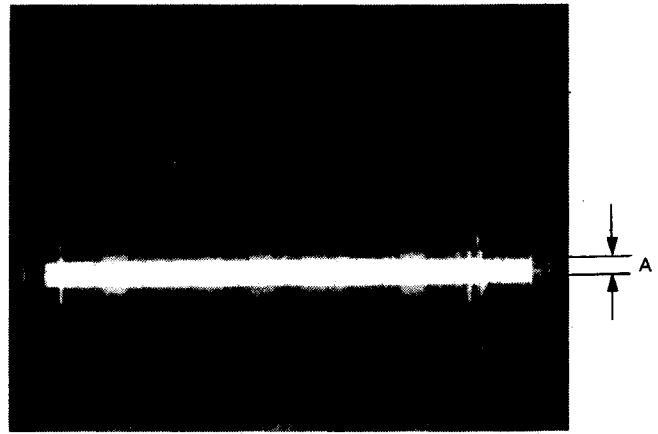
4-6-3. Aperture Adjustment

Object: Grayscale chart
 Equipment: Oscilloscope
 Preparation: Set the white level to 100 IRE (NTSC)/700 mV (PAL) with the iris control.
 Test point: TP10 (GND; E2)/SG-198 board
 Trigger: HD (pin 2 of CN302/SG-198 board)
 Adj. point: RV3/SG-198 board
 Specification: "A" must be minimized.



4-6-4. Aperture Crispening Adjustment

Object: Burst chart
 Equipment: Oscilloscope
 Preparation: Set the white level to 80 IRE (NTSC)/560 mV (PAL) with the iris control.
 Test point: TP11 (GND; E2)/SG-198 board
 Trigger: HD (pin 2 of CN302/SG-198 board)
 Adj. point: RV4/SG-198 board
 Specification: "A" must be about 6 mV.



SG-198 board (component side)

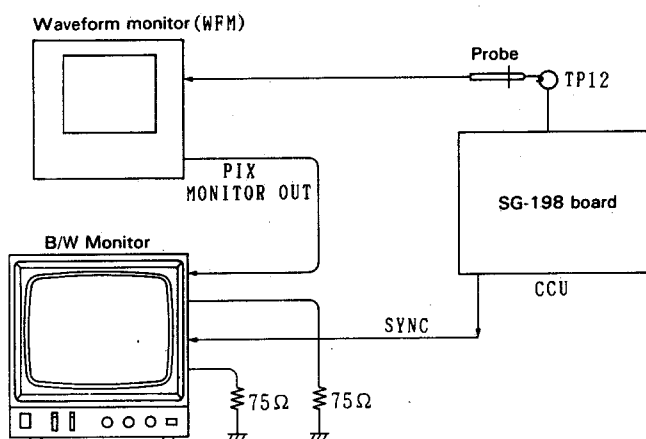
4-6-5. Resolution Adjustment

Note: Be sure to perform this adjustment after the SG-198 board or the CHU was replaced.

Object: Resolution chart

Equipments: Waveform monitor, B/W monitor

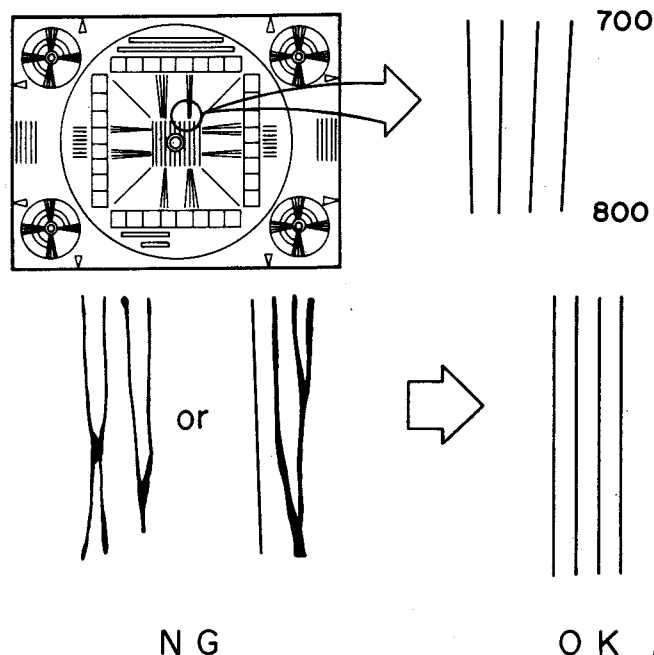
- Preparation:**
- Adjust the zoom control so that the resolution chart frame touches the underscanned picture frame and set the sharpest focus.
 - Set the white level to 90 IRE (NTSC)/630 mV (PAL) with the iris control.
 - After the above setting is complete, connect the measuring equipment as illustrated.



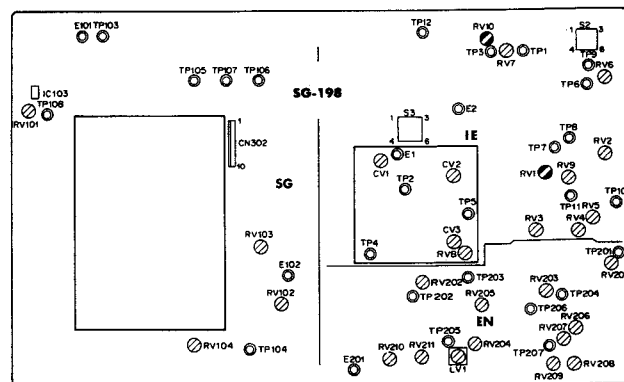
- * Set the brightness and contrast knobs to maximum position and adjust the brightness knob so that the sharpest focus is obtained.
- Rotate the DETAIL knob fully counter-clockwise.
- Set switches S2 and S3 on the SG-198 board to "1" position.

Adjustment:

Perform the procedures 1 to 5 so that between 700 and 800 TV lines of the resolution chart can be monitored as illustrated.



1. Adjust  RV10/SG-198 board so that the sharpest focus is obtained.
2. Set switch S2 to 1, then to 2, 3, 4, 5 and 6 until a sharper focus than in procedure 1 is obtained. If not, set switch S3 to 1, then to 2, 3, 4, 5 and 6 with switch S2 set first to 1, then to 2 and so on until the sharpest focus is obtained.
3. Readjust  RV10/SG-198 board so that the sharpest focus is obtained.
4. Adjust  RV1/TG-108 board of the CHU so that the sharpest focus is obtained.
5. Lastly, adjust  RV10/SG-198 board so that the sharpest focus is obtained.



SG-198 board (component side)

4-6-7. Crispening Adjustment

Object: Grayscale

Equipment: Oscilloscope

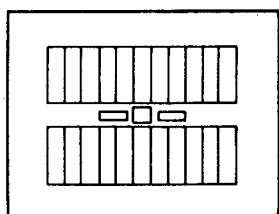
Preparation: Rotate RV2 (CRISPENING)/SG-198 board fully clockwise .

Test point: TP8 (GND: E2)/SG-198 board

Trigger: HD (pin 2 of CN302/SG-198 board)

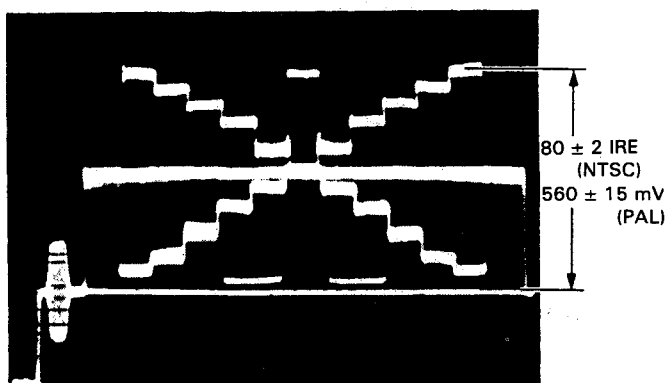
Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.



Monitor screen

2. Adjust the iris control so that the video level is 80 ± 2 IRE (NTSC)/ 560 ± 15 mV (PAL) on the waveform monitor.



3. Adjust $\odot$ RV2/SG-198 board so that the level of A at TP8/SG-198 board is 40 ± 5 mV. Connection of a $10\text{ k}\Omega$ -resistor between the oscilloscope probe and TP8 makes it easier to detect noise.



4-6-8. H.V.Ratio Adjustment

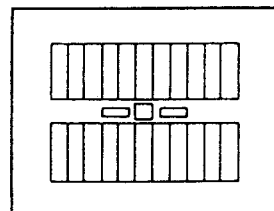
Object: Gray scale

Equipment: B/W monitor

Preparation: Rotate  RV6 (DTL LEVEL)/SG-198 board fully counterclockwise .

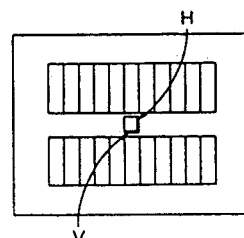
Adjustment:

1. Set the zoom control at TELE end and shoot the grayscale chart.

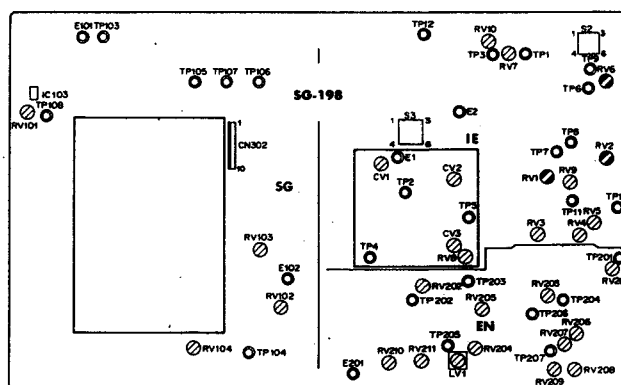


Monitor screen

2. Adjust the iris control so that the video level is 80 ± 2 IRE (NTSC)/ 560 ± 15 mV (PAL) on the waveform monitor.
3. Keep an eye on the white portion on the grayscale chart and adjust $\odot$ RV1/SG-198 board so that the H and V detail volume is balanced.



Monitor screen

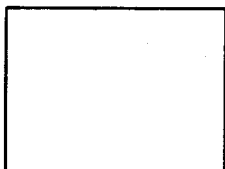


SG-198 board (component side)

4-6-9. IE OH/2H Level Adjustment

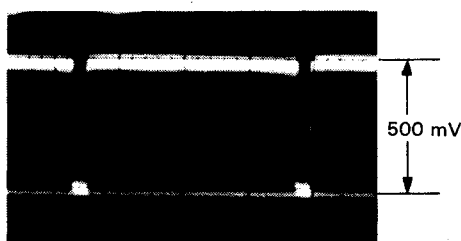
Object: White pattern
 Equipment: Oscilloscope
 Trigger: VD (pin 1 of CN302/SG-198 board)
 Adjustment:

1. Adjust the zoom control so that the white pattern frame touches the underscanned picture frame on the monitor.



Monitor screen

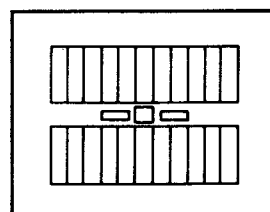
2. Set the lens iris so that the video level at TP1/SG-198 board is 500 ± 10 mV.
3. Adjust RV8/SG-198 board so that the video level at TP1 and TP5/SG-198 board are equal.



4-6-10. Detail Level Adjustment

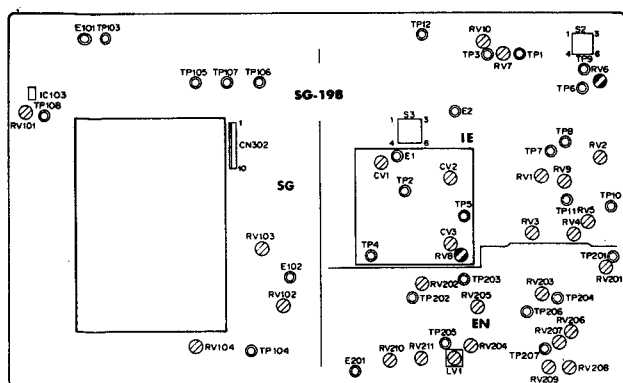
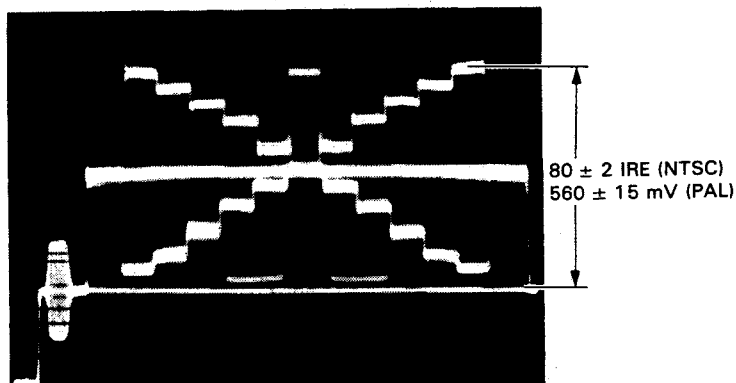
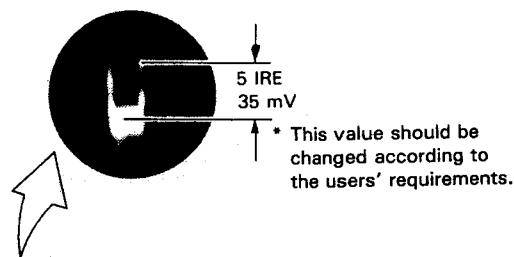
Object: Grayscale chart
 Equipment: Waveform monitor
 Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.



Monitor screen

2. Adjust the iris control so that the video output level is 80 ± 2 IRE on the waveform monitor.
3. Set the DETAIL knob to mechanical center.
4. Adjust RV6/SG-198 board so that the smaller detail level at both ends of the white level is about 5 IRE (NTSC)/35 mV (PAL).



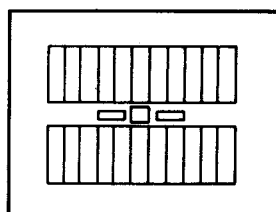
SG-198 board (component side)

4-7. AUTO SYSTEM

4-7-1. Low Light Adjustment

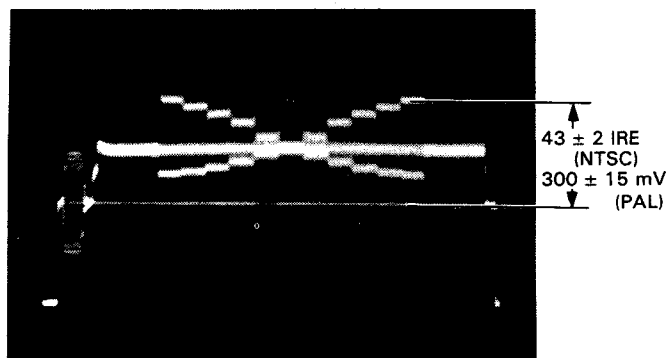
Object: Grayscale chart
 Equipment: Waveform monitor
 Adjustment point: Ⓐ RV101/PR-162 board
 Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.



Monitor screen

2. Adjust the lens iris control so that the white level of the video signal is 43 ± 2 IRE (NTSC)/ 300 ± 15 mV (PAL).



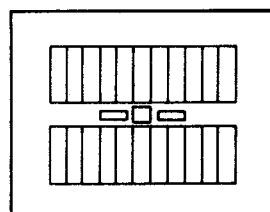
3. Rotate Ⓐ RV101/PR-162 board clockwise from the left-most position until the point where the "LOW LIGHT" lamp lights up on the front panel.
4. Open the iris control slowly and confirm that the "LOW LIGHT" lamp disappears.

4-7-2. Auto Iris Adjustment

Object: Grayscale chart
 Equipment: Waveform monitor
 Preparation: Set the IRIS switch to AUTO.
 Rotate Ⓐ RV102 (IRIS MODE)/PR-162 board fully clockwise Ⓐ.

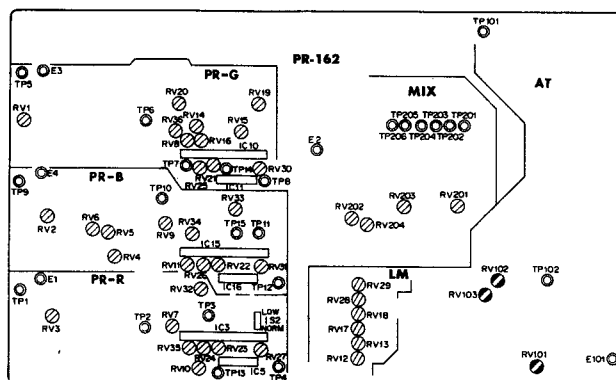
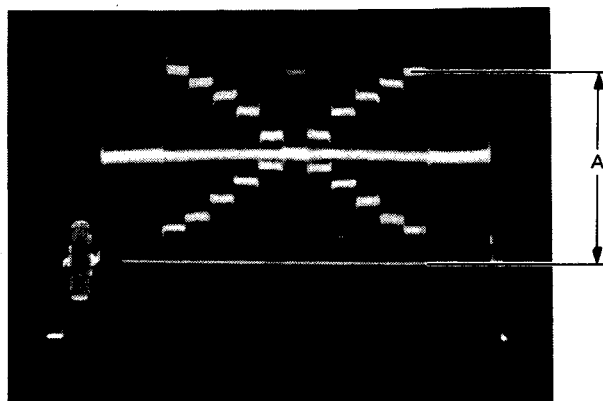
Adjustment:

1. Adjust the zoom control so that the grayscale chart frame touches the underscanned picture frame on the monitor.



Monitor screen

2. Adjust Ⓐ RV103 (IRIS SET)/PR-162 board so that the white peak level "A" is 90 ± 2 IRE (NTSC)/ 630 ± 15 mV (PAL).
3. Adjust Ⓐ RV102 (IRIS MODE)/PR-162 board so that the white peak level "A" is 100 ± 2 IRE (NTSC)/ 700 ± 15 mV (PAL).

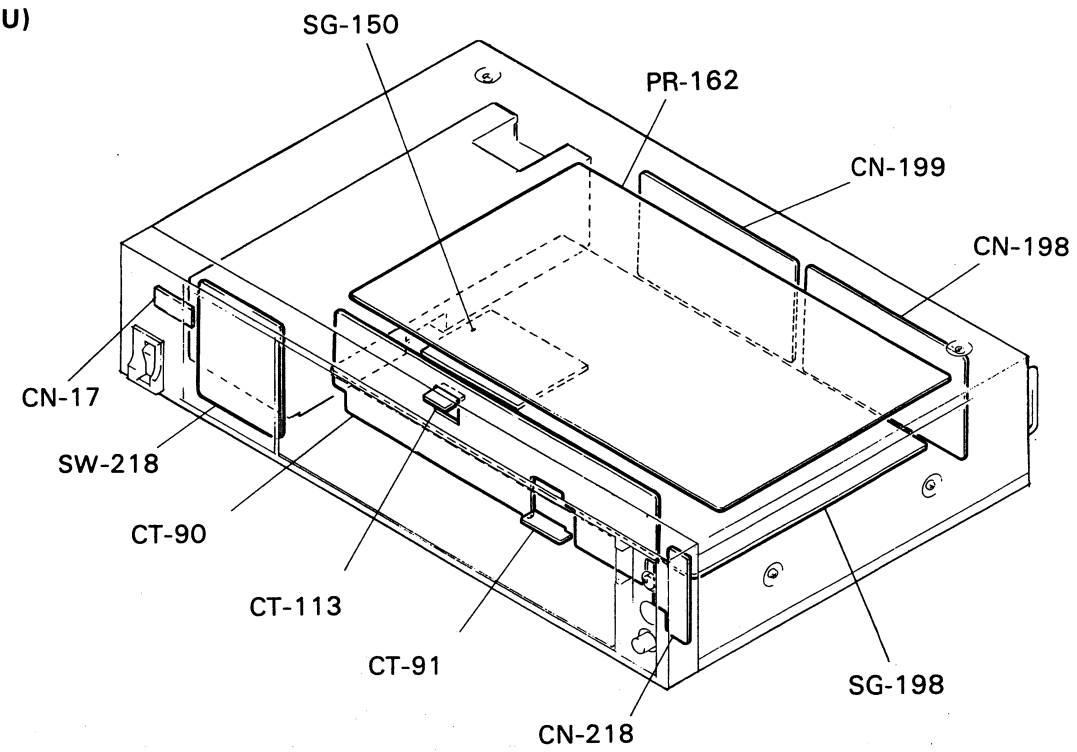


PR-162 board (component side)

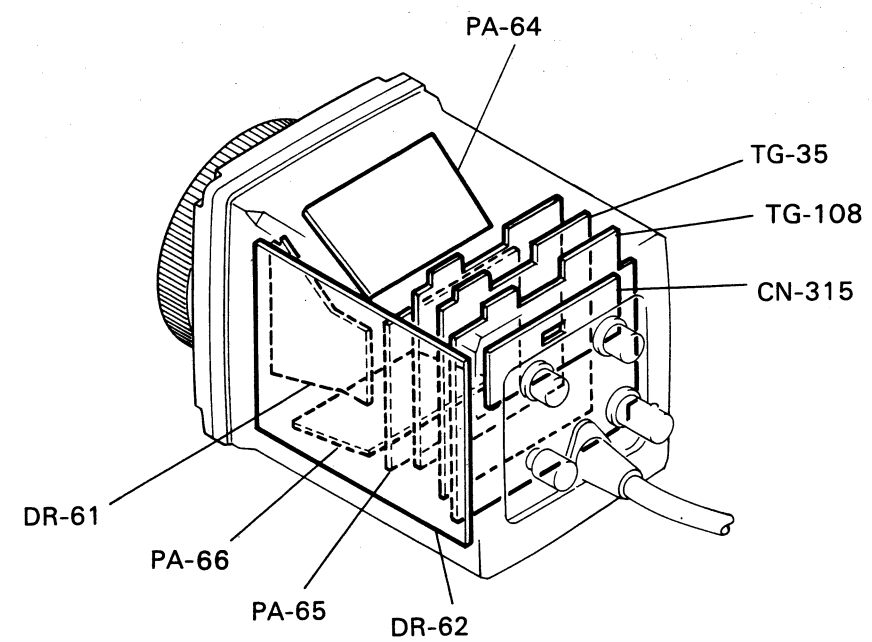
第5章
回路図・マウント図
CHAPTER 5
DIAGRAM

5-1. 基板配置図
5-1. BOARD LOCATION

(CCU)



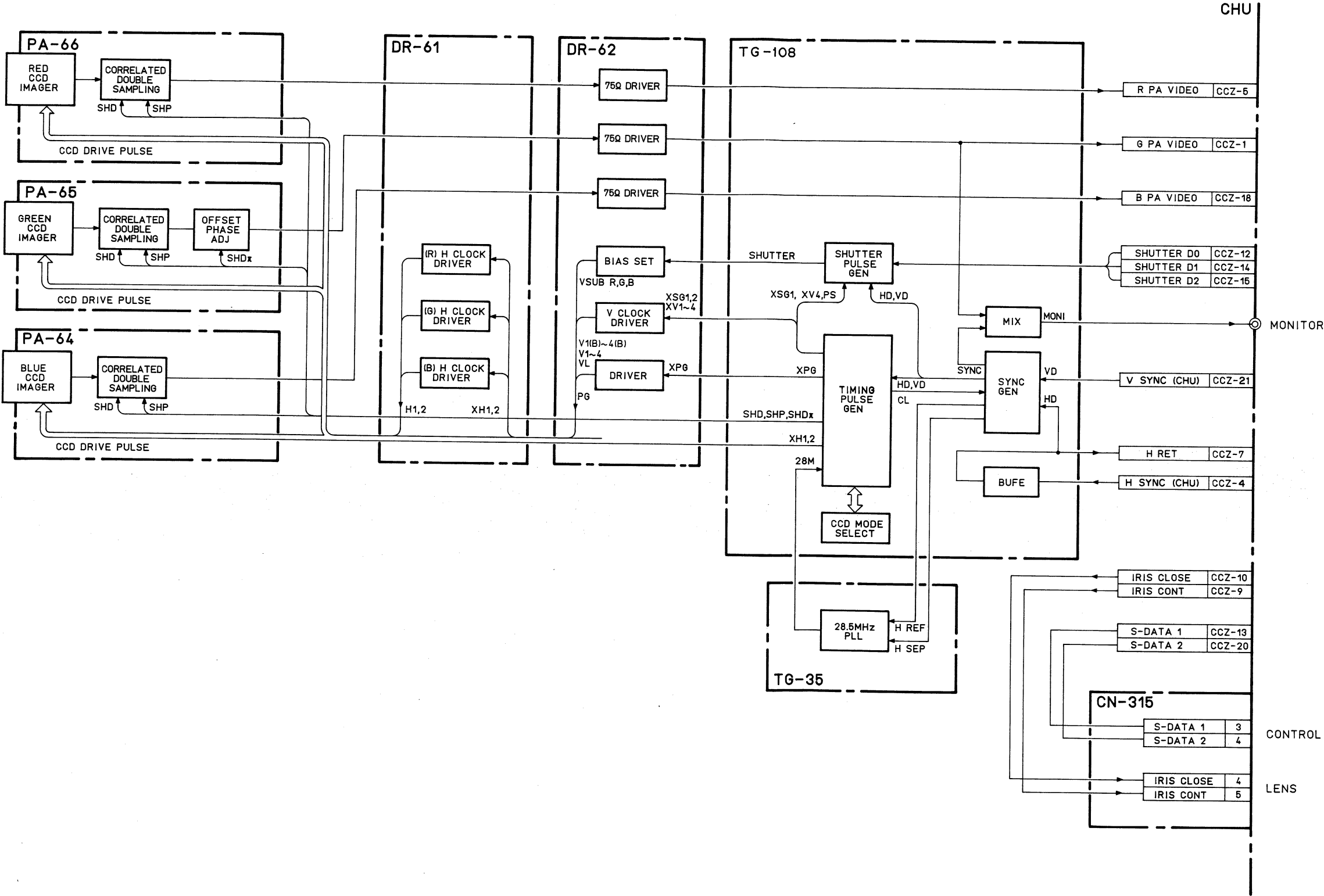
(CHU)



5-2. ブロック図

5-2. BLOCK DIAGRAM

CHU



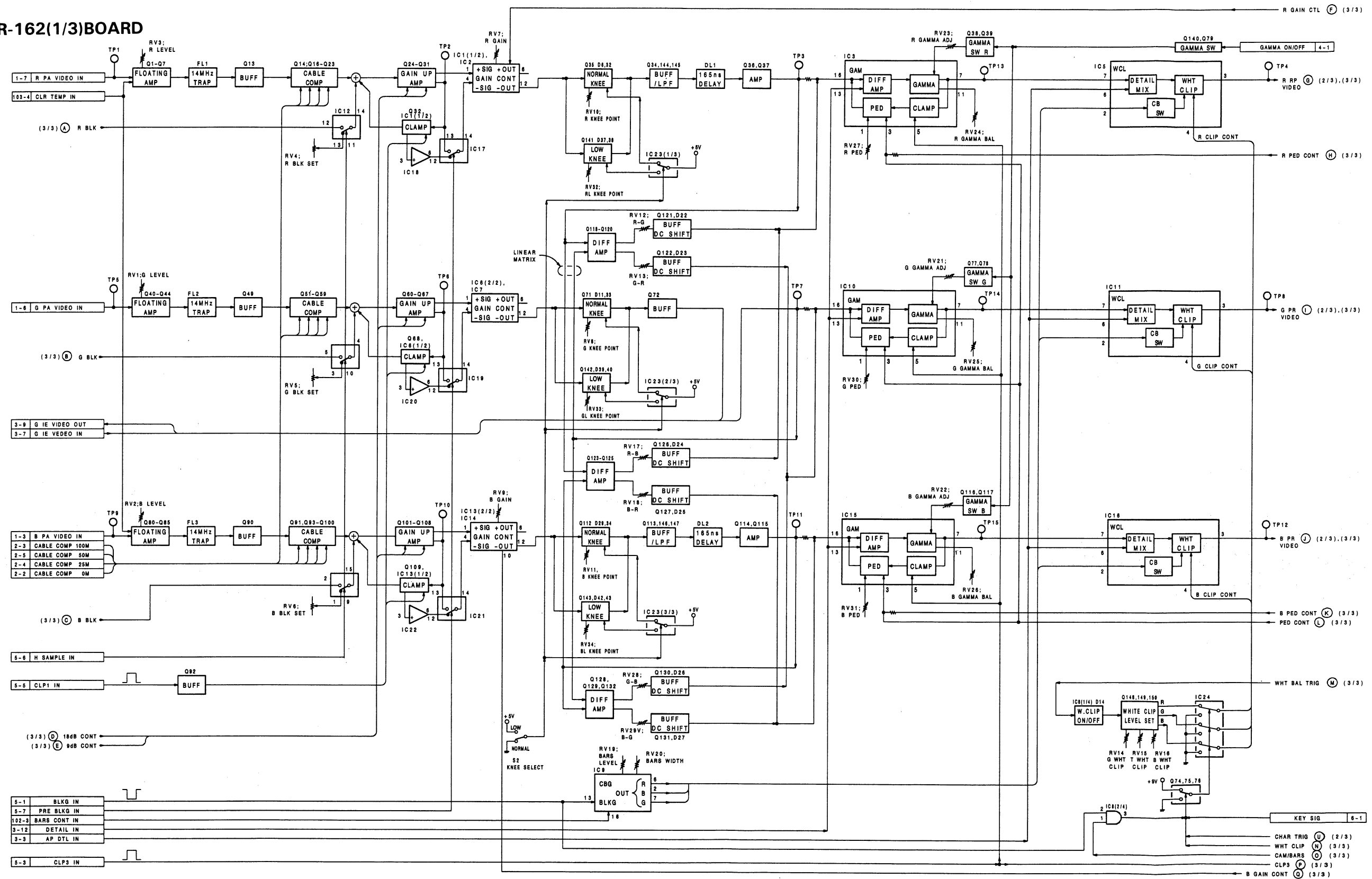
CHU BLOCK

DXC-755 (UC, J)

DXC-755P (EK)

DXC-760MD (UC, J)

PR-162(1/3)BOARD

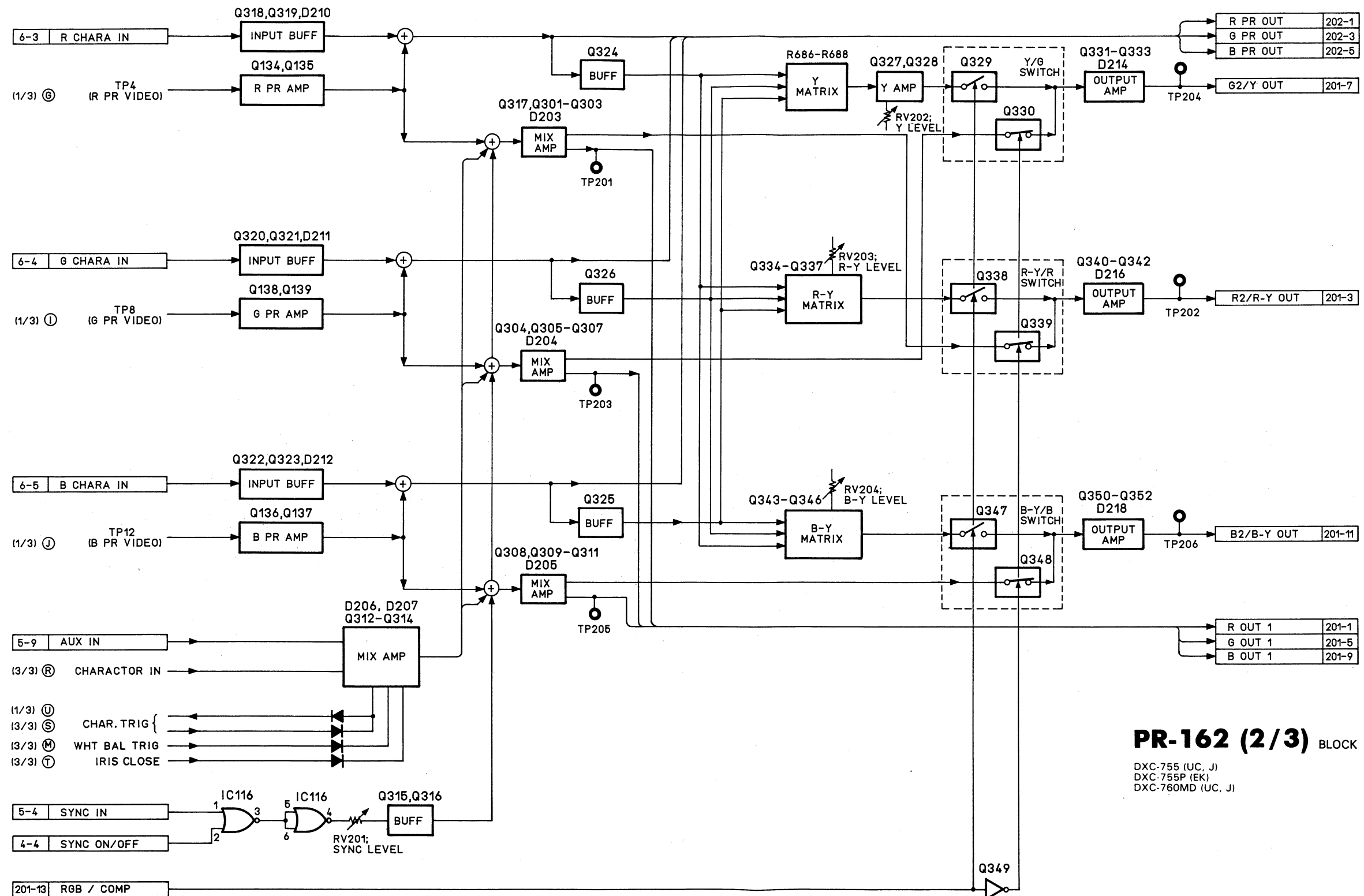


PR-162 (1/3) BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

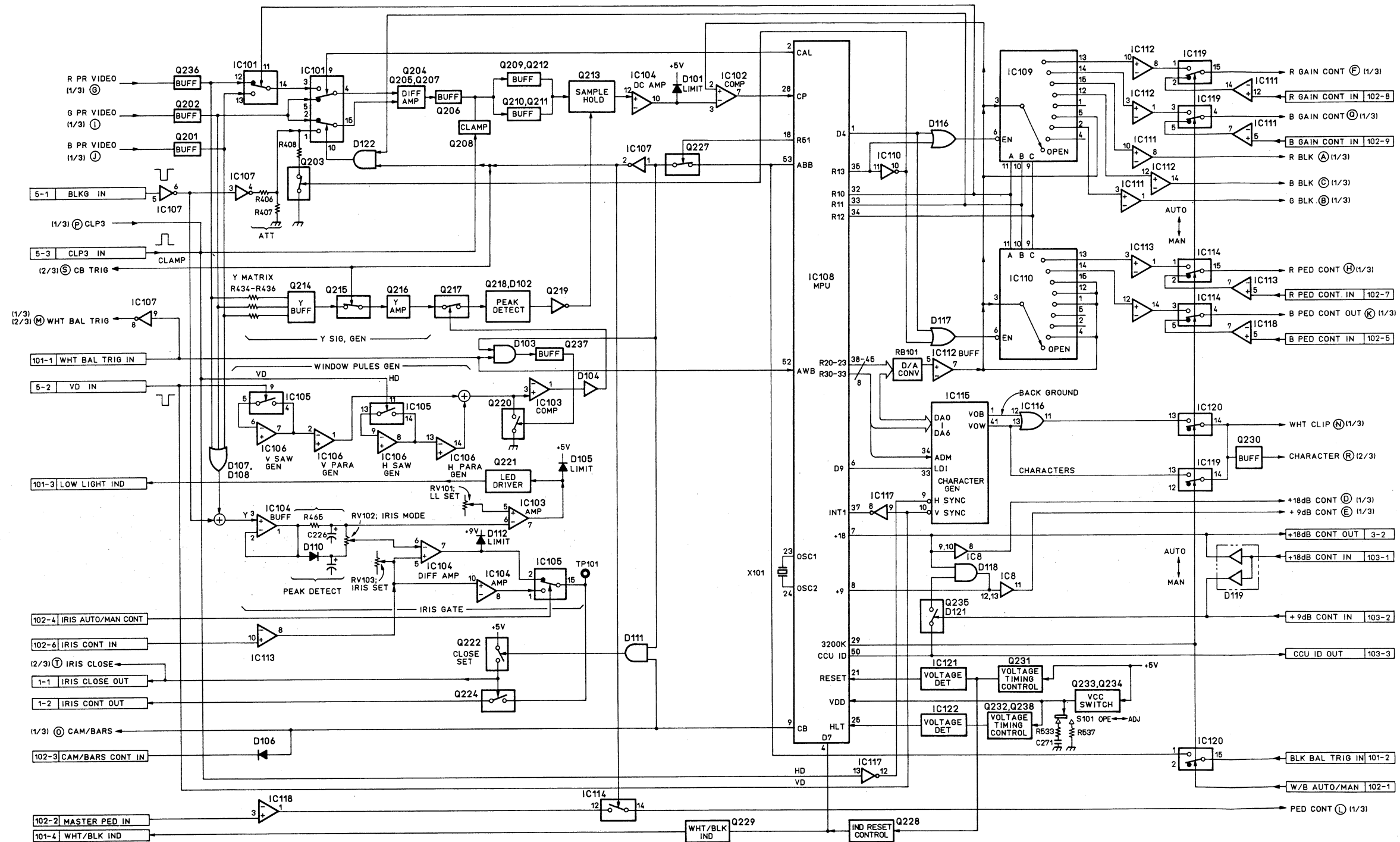
PR-162(2/3)BOARD



PR-162 (2/3) BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

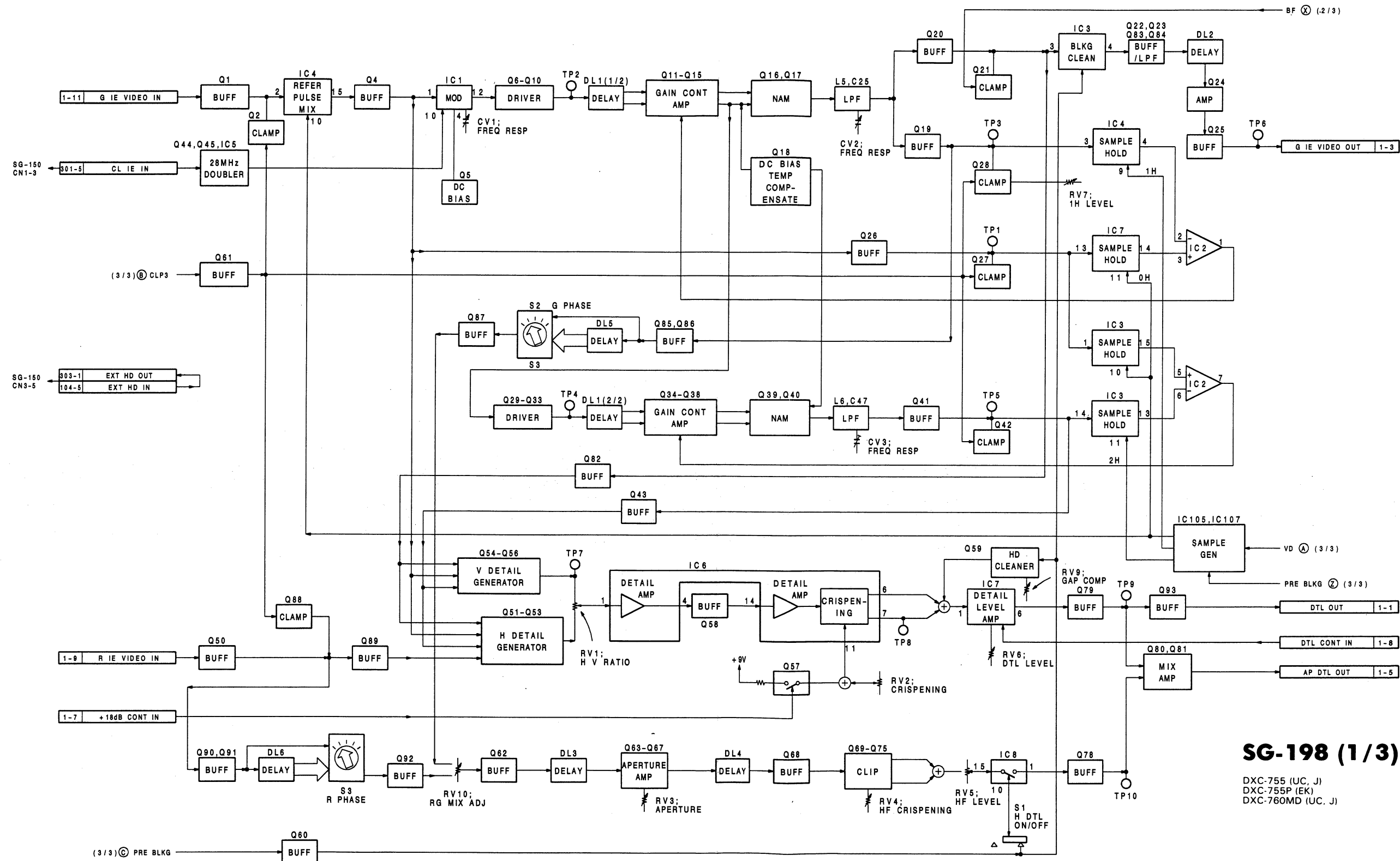
PR-162(3/3)BOARD



PR-162 (3/3) BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

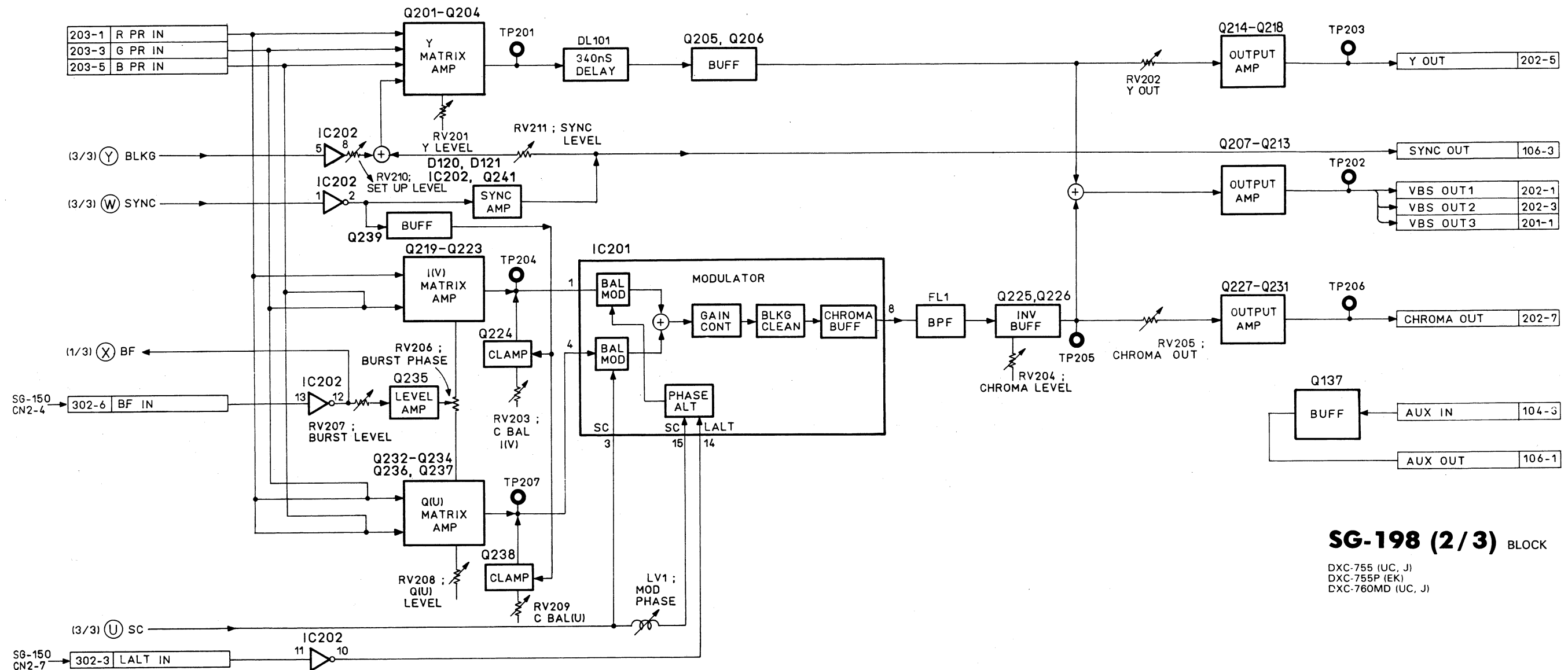
SG-198(1/3)BOARD



SG-198 (1/3) .BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

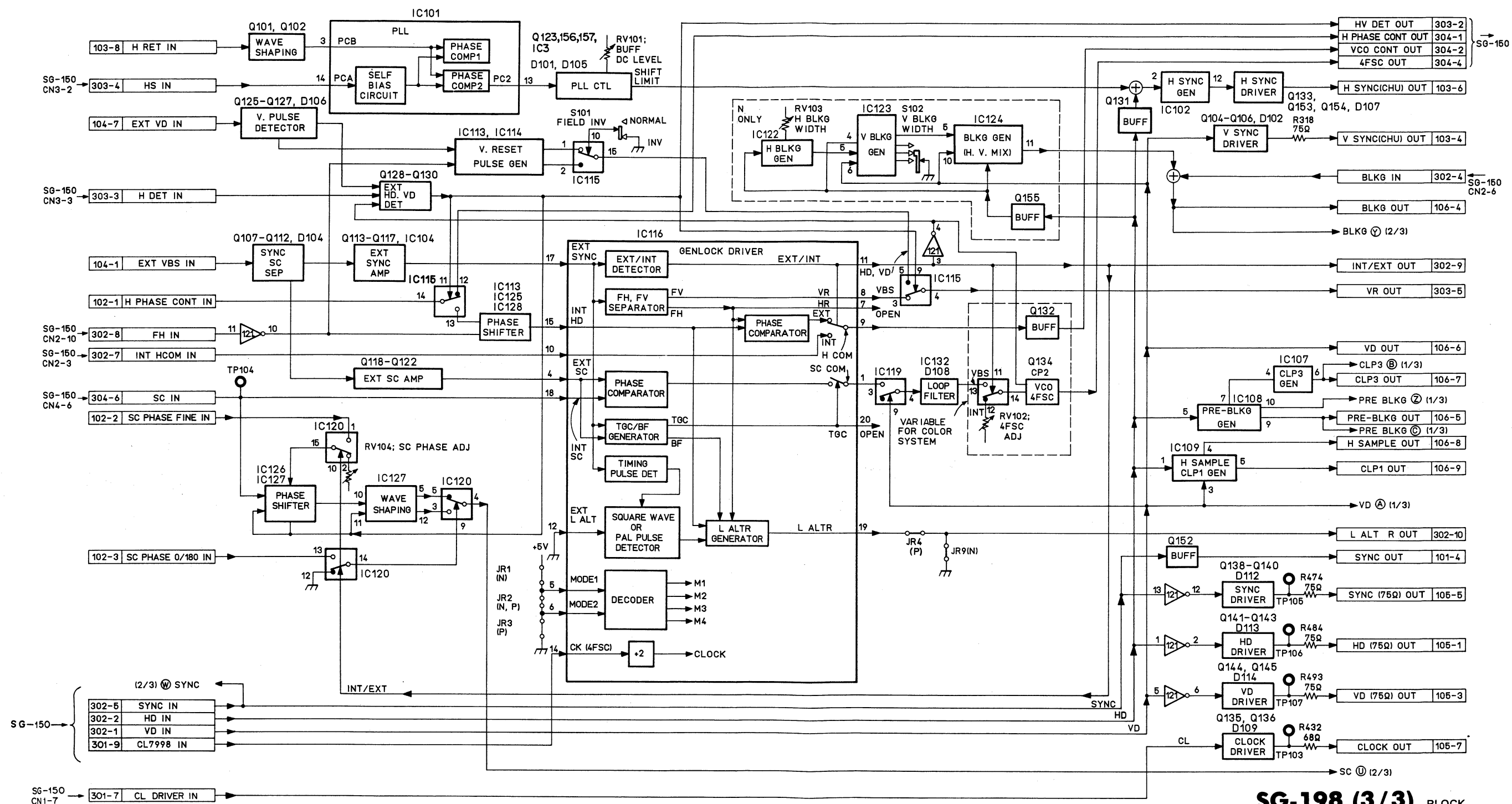
SG-198(2/3)BOARD



SG-198 (2 / 3) BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198(3/3)BOARD

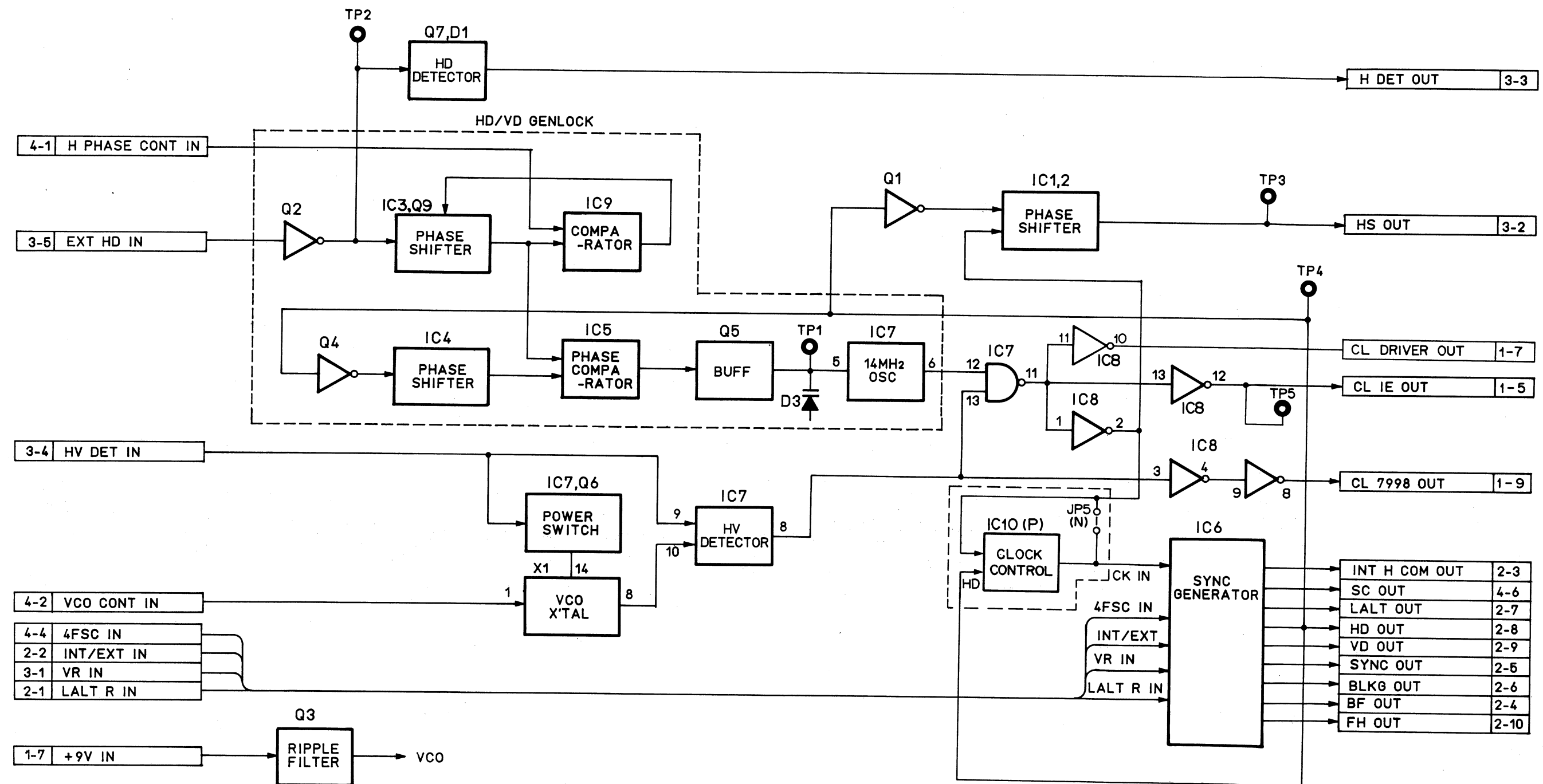


SG-198 (3/3) BLOCK

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

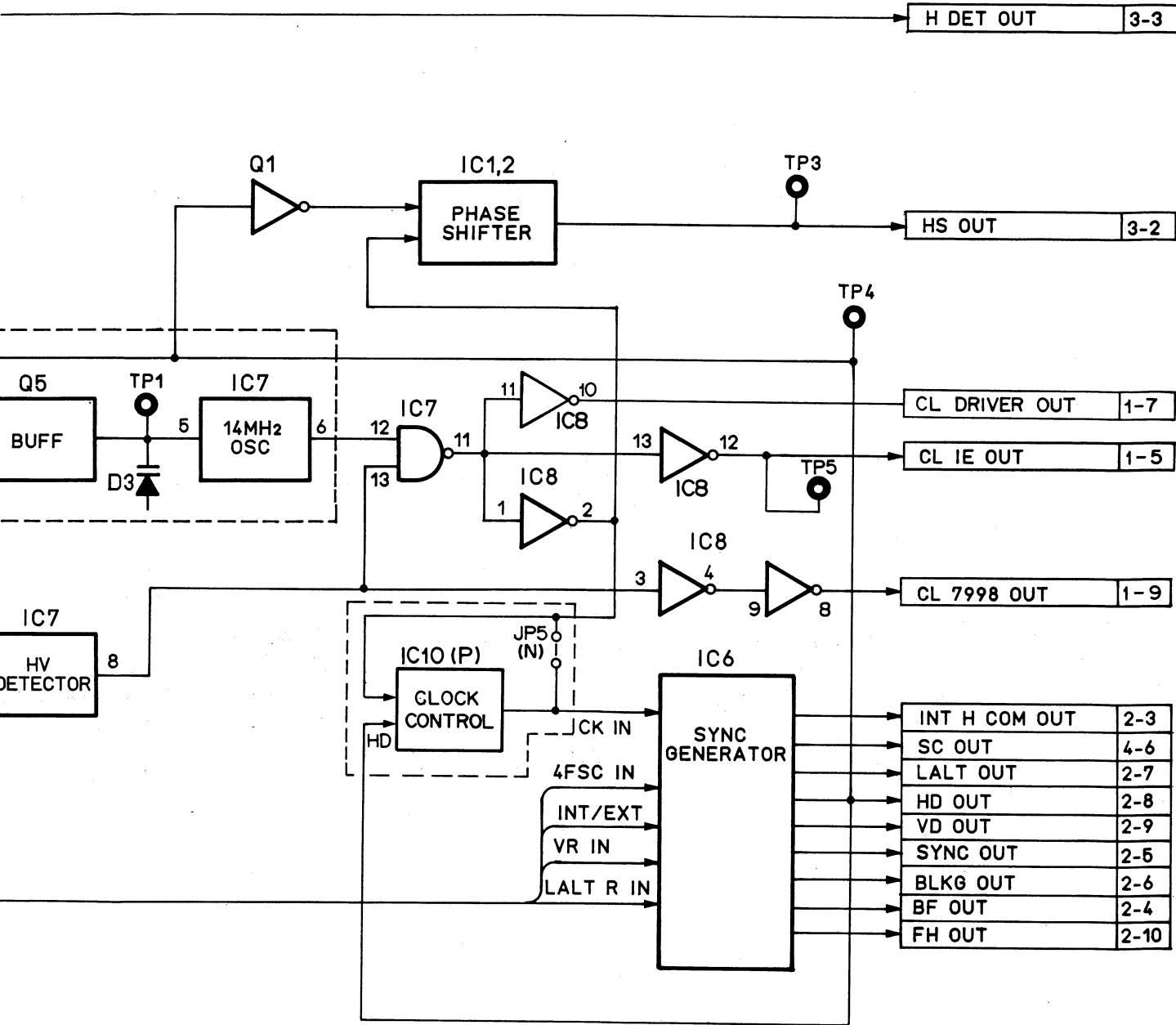
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-150 BOARD



SG-150 BLOCK

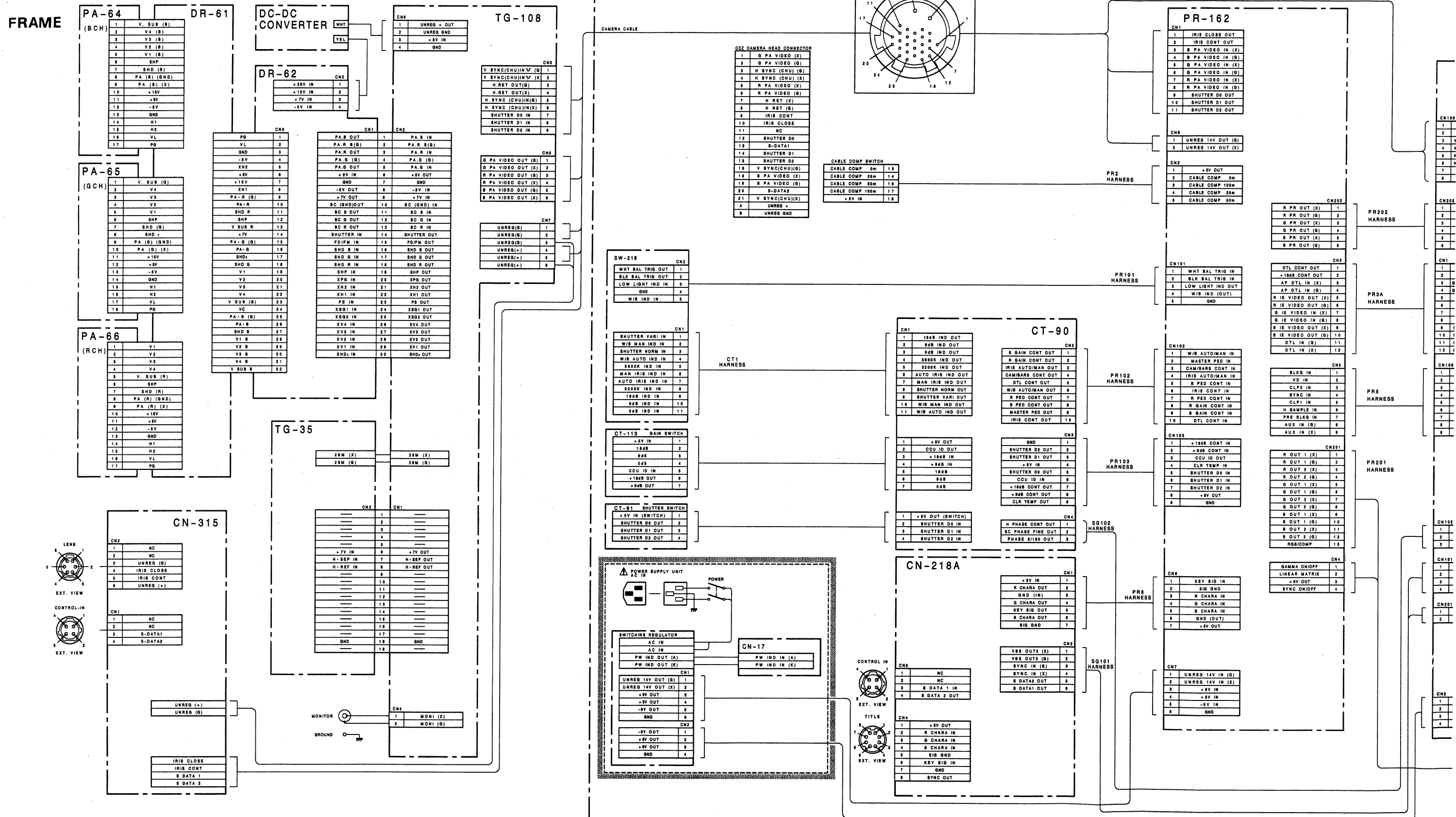
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

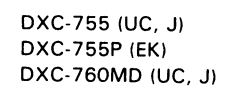


SG-150 BLOCK
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

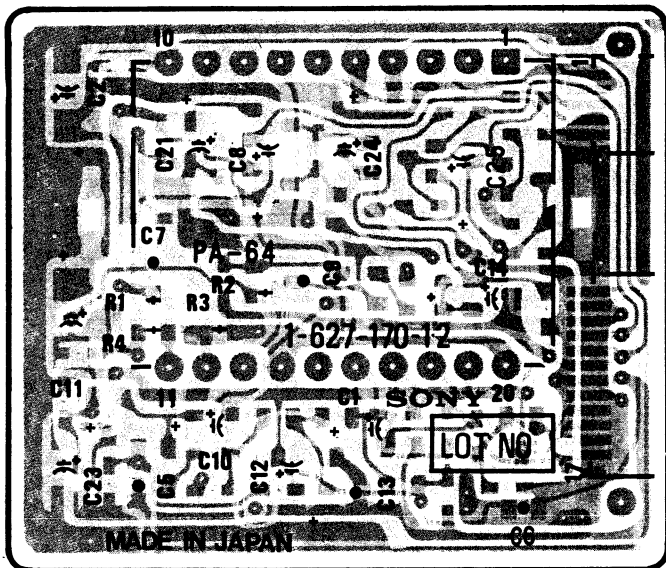
5-3. 回路図・マウント図

5-3. SCHEMATIC AND MOUNTING DIAGRAM



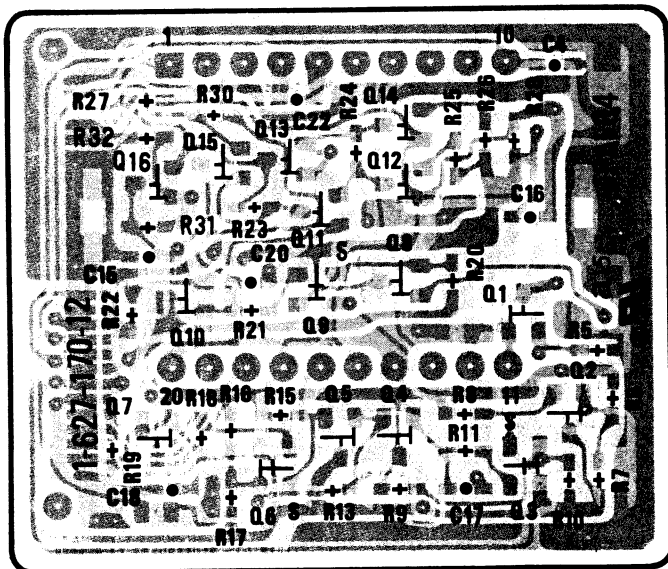


PA-64 BOARD



PA-64 BOARD

—COMPONENT SIDE—
1-627-171-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

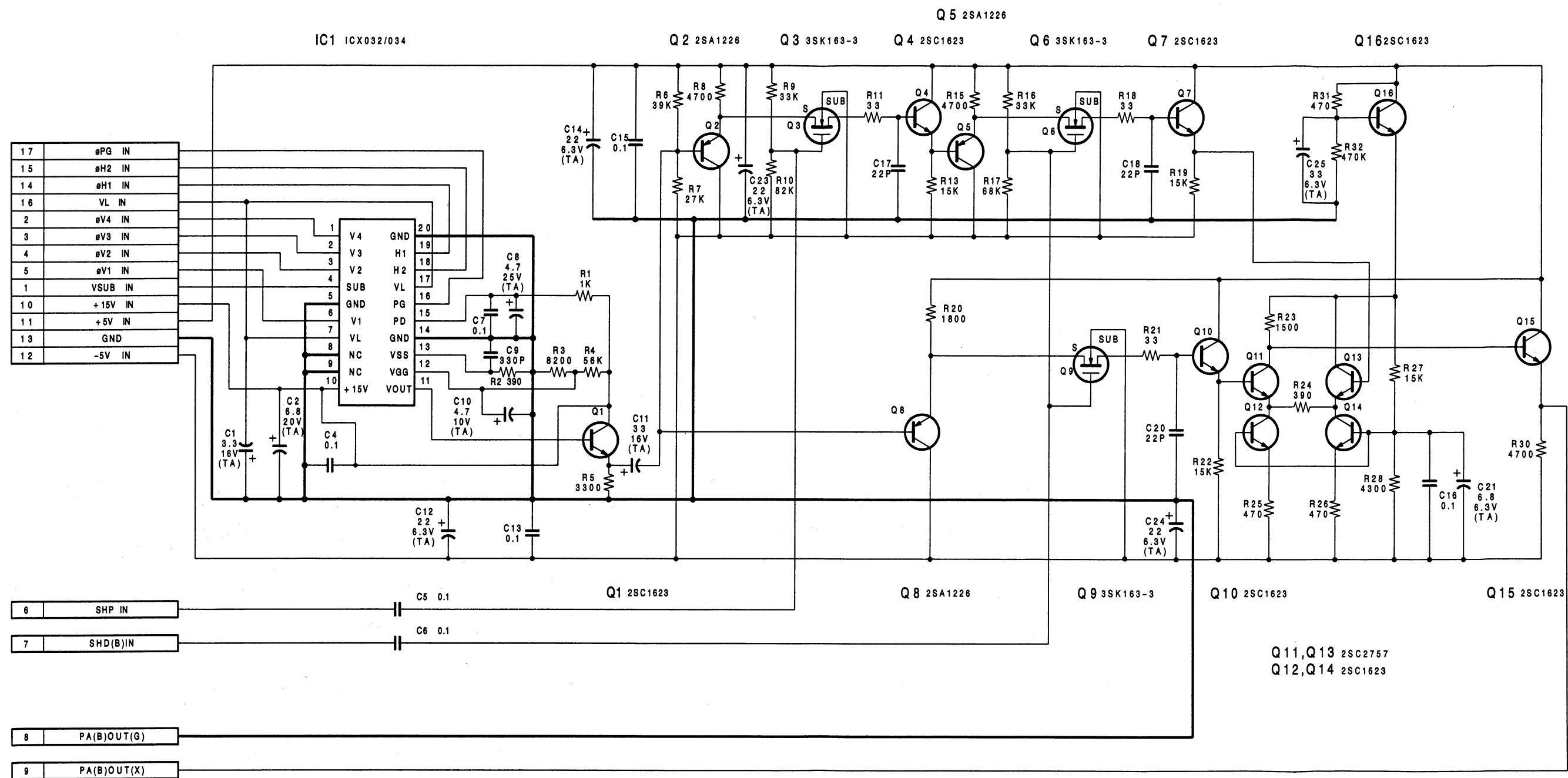


PA-64 BOARD

—SOLDERING SIDE—
1-627-171-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

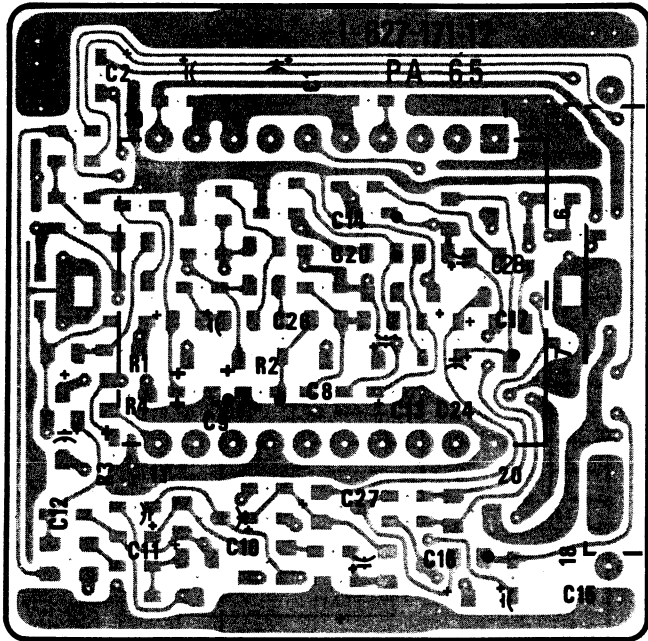
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PA-64 BOARD

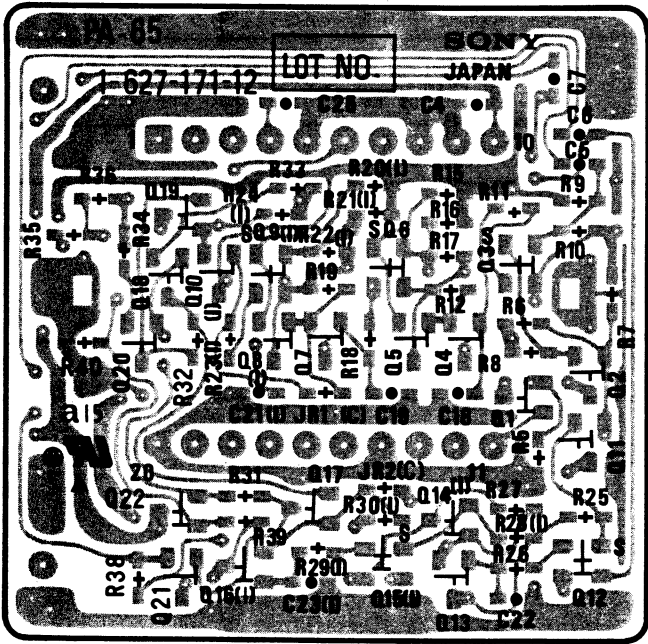


PA-64 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PA-65 BOARD



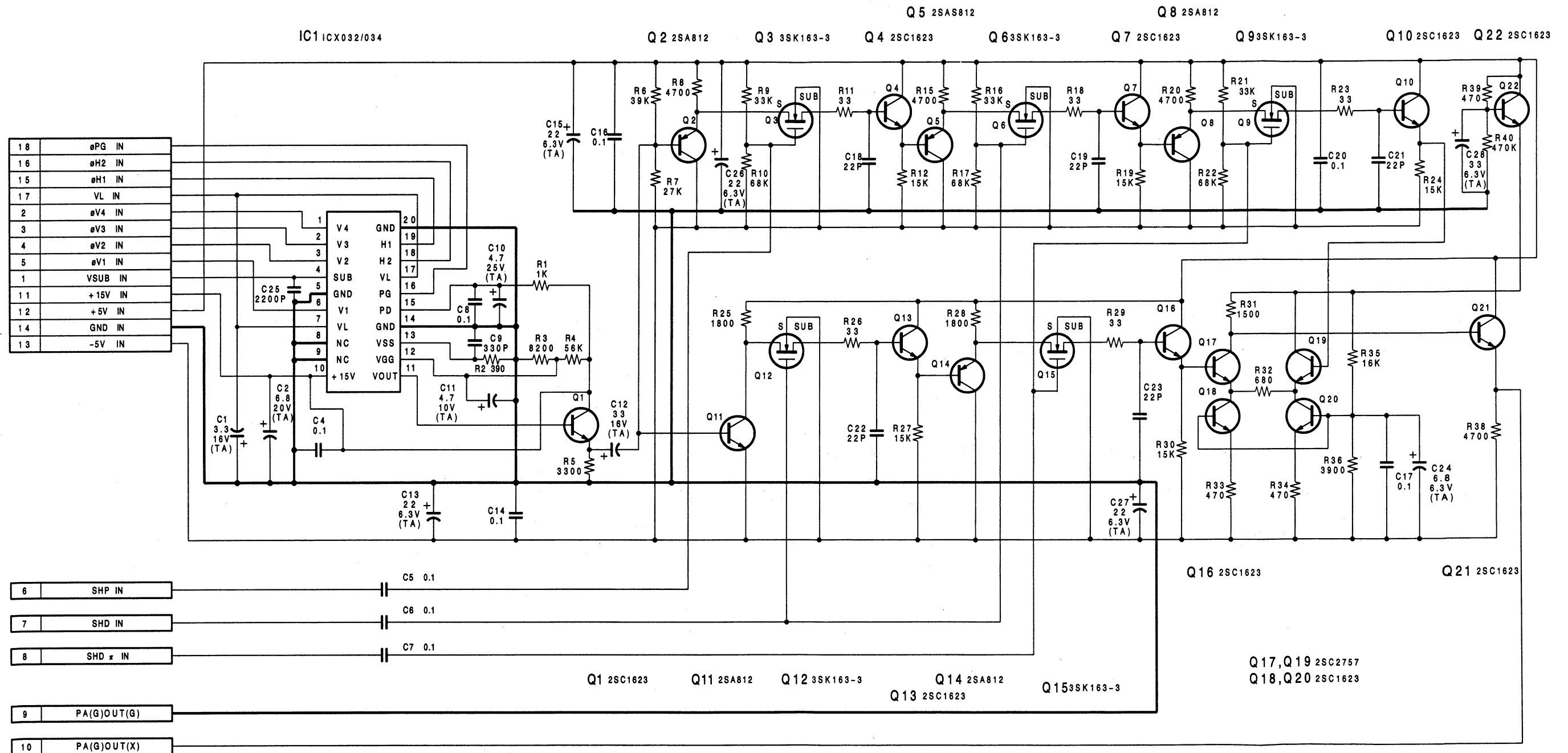
PA-65 BOARD
—COMPONENT SIDE—
1-627-171-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



PA-65 BOARD
—SOLDERING SIDE—
1-627-171-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

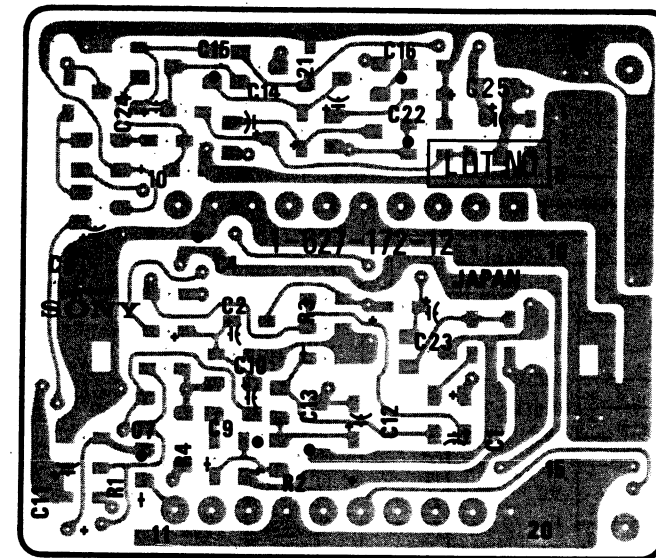
PA-65 BOARD



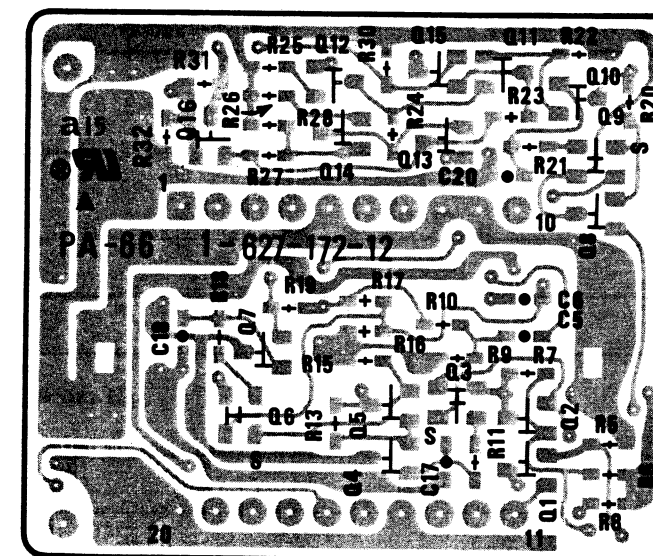
PA-65 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PA-66 BOARD

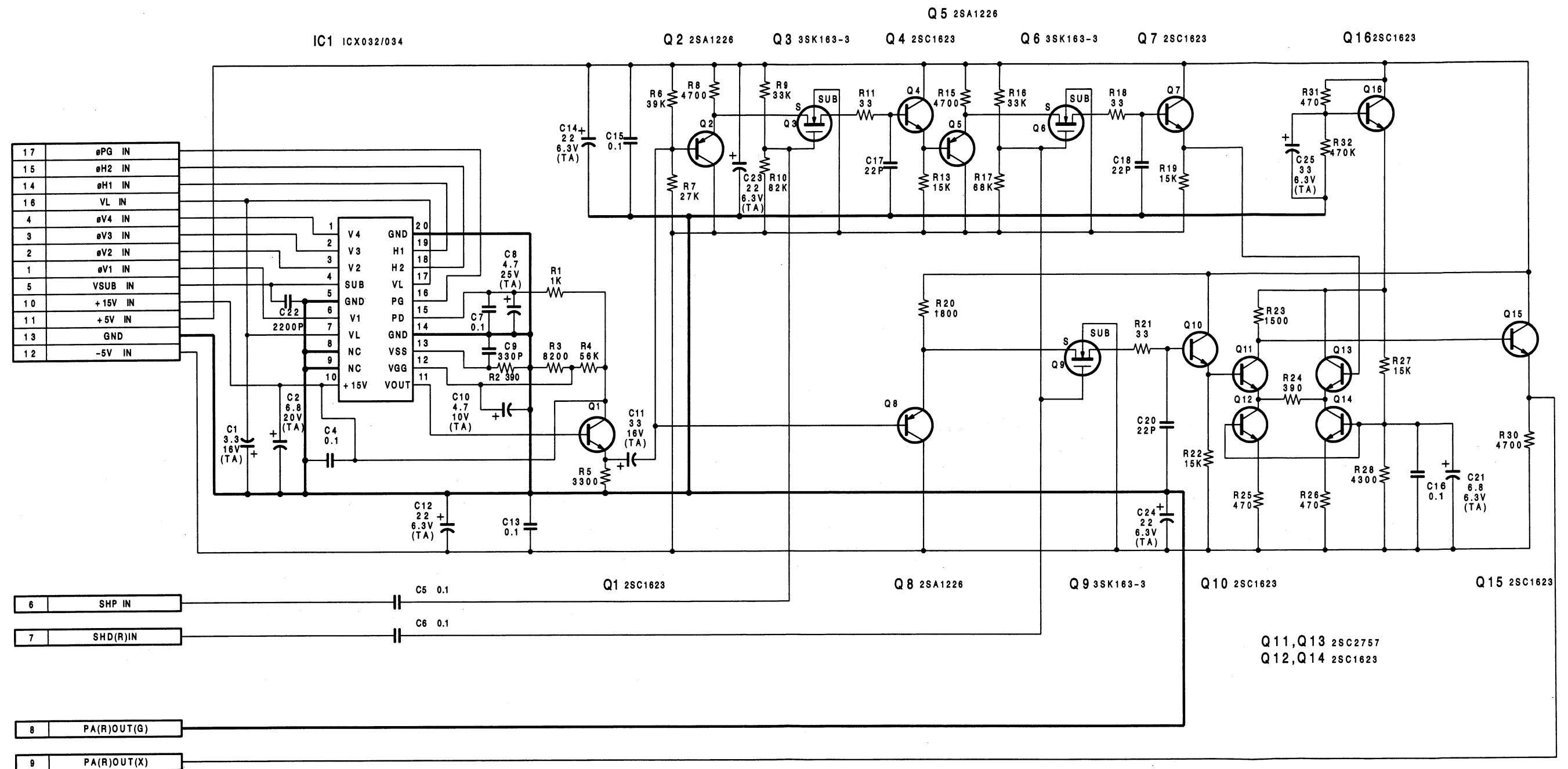


PA-66 BOARD
—COMPONENT SIDE—
1-627-172-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



PA-66 BOARD
—SOLDERING SIDE—
1-627-172-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

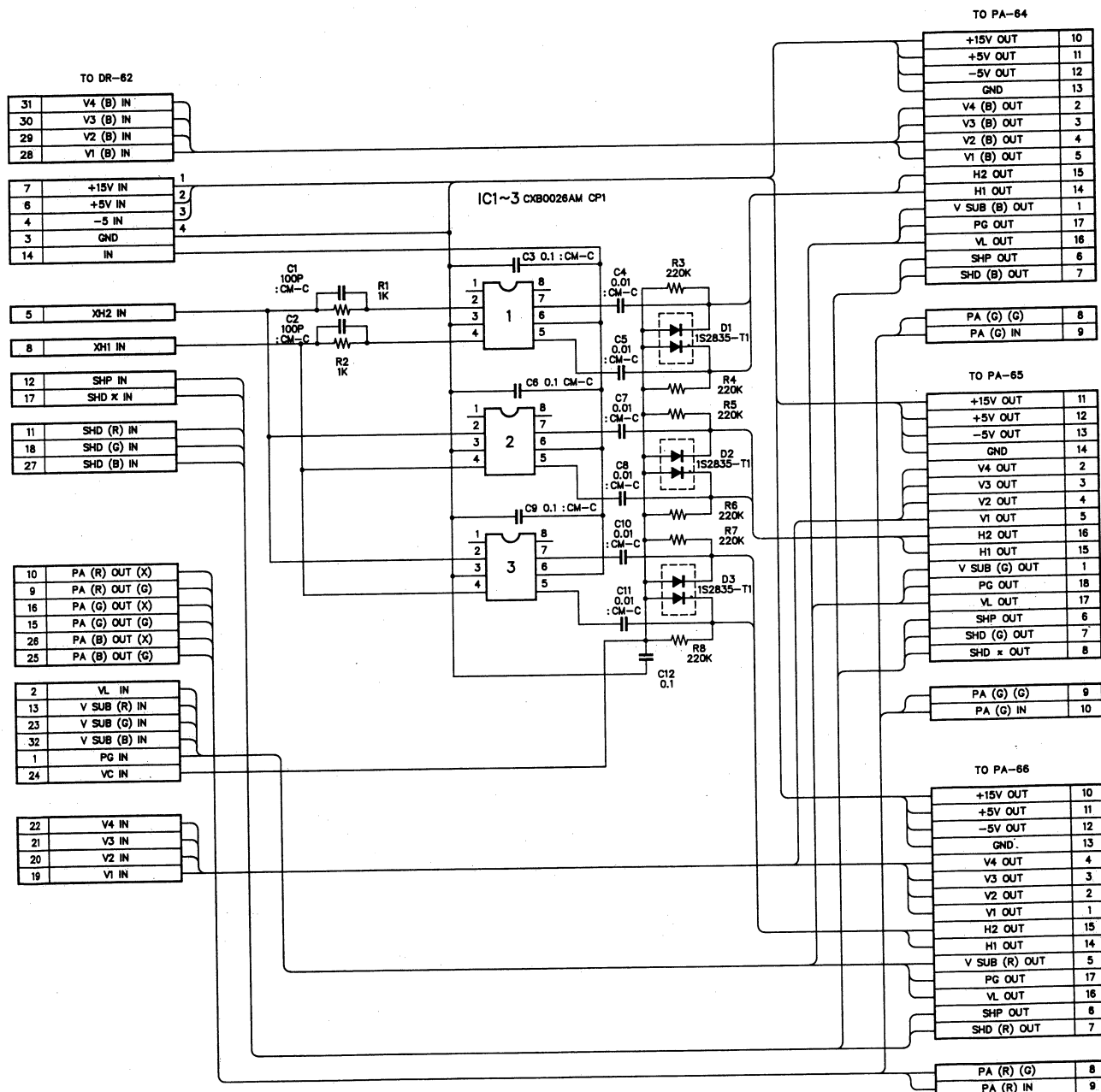
PA-66 BOARD



PA-66 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DR-61 BOARD



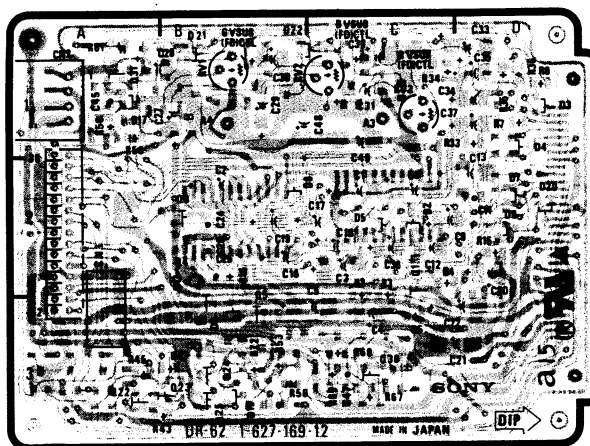
DR-61 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DR-62 BOARD

COMPONENT SIDE

CN1	A-2	Q1	C-2
CN2	A-1	Q3	B-2
		Q4	B-2
D2	C-2	Q5	B-3
D3	D-1	Q6	B-3
D4	D-1	Q22	A-3
D5	C-2	Q23	B-3
D6	B-2	Q24	B-3
D7	D-2	Q25	B-3
D8	D-2	Q31	A-1
D9	B-3	Q36	C-3
D13	B-2		
D15	B-3	RV1	B-1
D17	A-1	RV2	C-1
D20	D-2	RV3	C-1
D21	B-1		
D22	C-1		

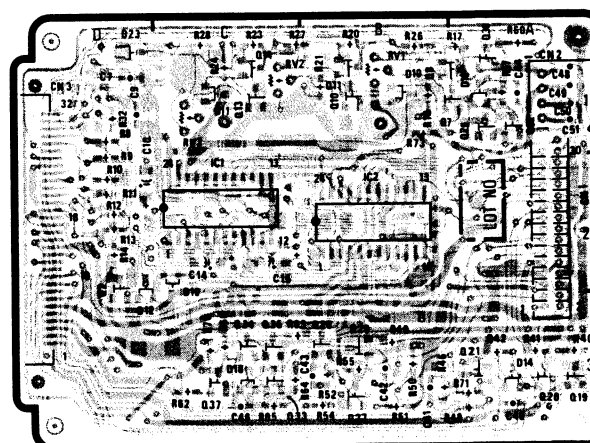


DR-62 BOARD

— COMPONENT SIDE —
1-627-169-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SOLDERING SIDE

CN1	A-2	Q19	A-3
CN2	A-1	Q20	A-3
CN3	D-1	Q21	A-3
		Q26	B-3
D10	B-1	Q27	B-3
D11	C-1	Q28	B-3
D12	D-2	Q29	A-1
D14	A-3	Q30	A-1
D16	A-1	Q32	A-1
D18	C-3	Q33	C-3
D19	C-2	Q34	C-3
D23	D-1	Q35	C-3
		Q37	C-3
IC1	C-2	RV1	B-1
IC2	B-2	RV2	C-1
		RV3	C-1
Q2	D-2		
Q7	A-1		
Q8	A-1		
Q10	B-1		
Q11	B-1		
Q13	C-1		
Q14	C-1		

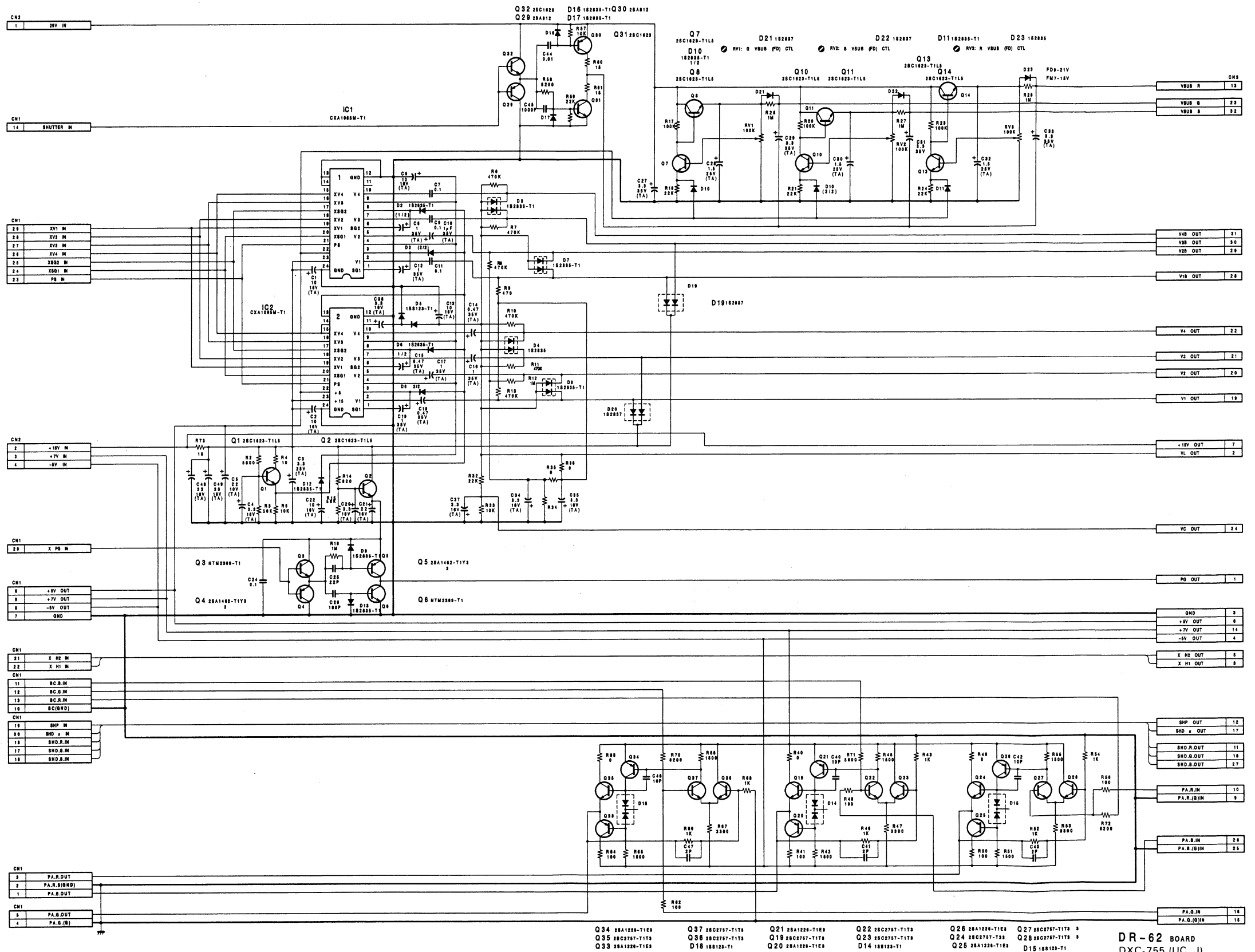


DR-62 BOARD

— SOLDERING SIDE —
1-627-169-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DR-62 BOARD



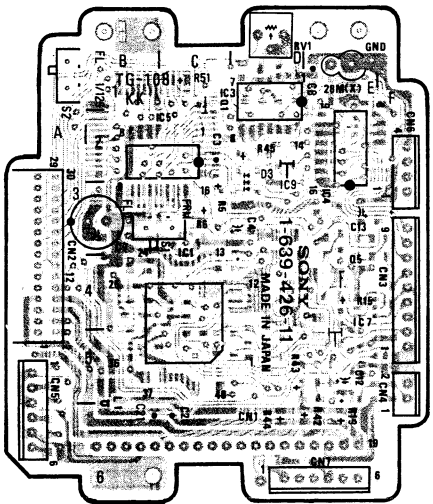
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DR-62 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

TG-108 BOARD

COMPONENT SIDE

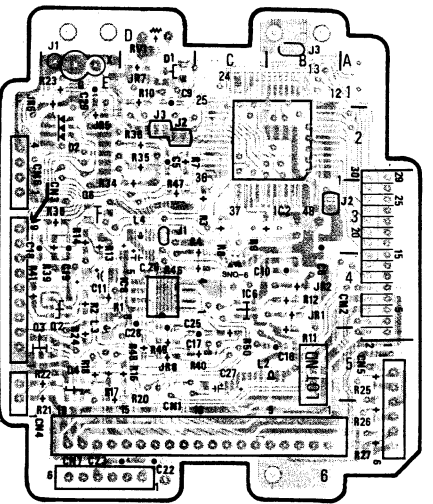
CN1	D-6
CN2	A-3
CN3	F-4
CN4	F-5
CN5	A-5
CN6	F-2
CN7	E-6
D3	D-2
IC1	C-3
IC3	C-1
IC4	E-3
IC5	C-2
IC7	E-4
IC9	D-2
Q1	C-1
RV1	D-1
S1	C-3
S2	A-1



TG-108 BOARD
— COMPONENT SIDE —
1-639-426-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

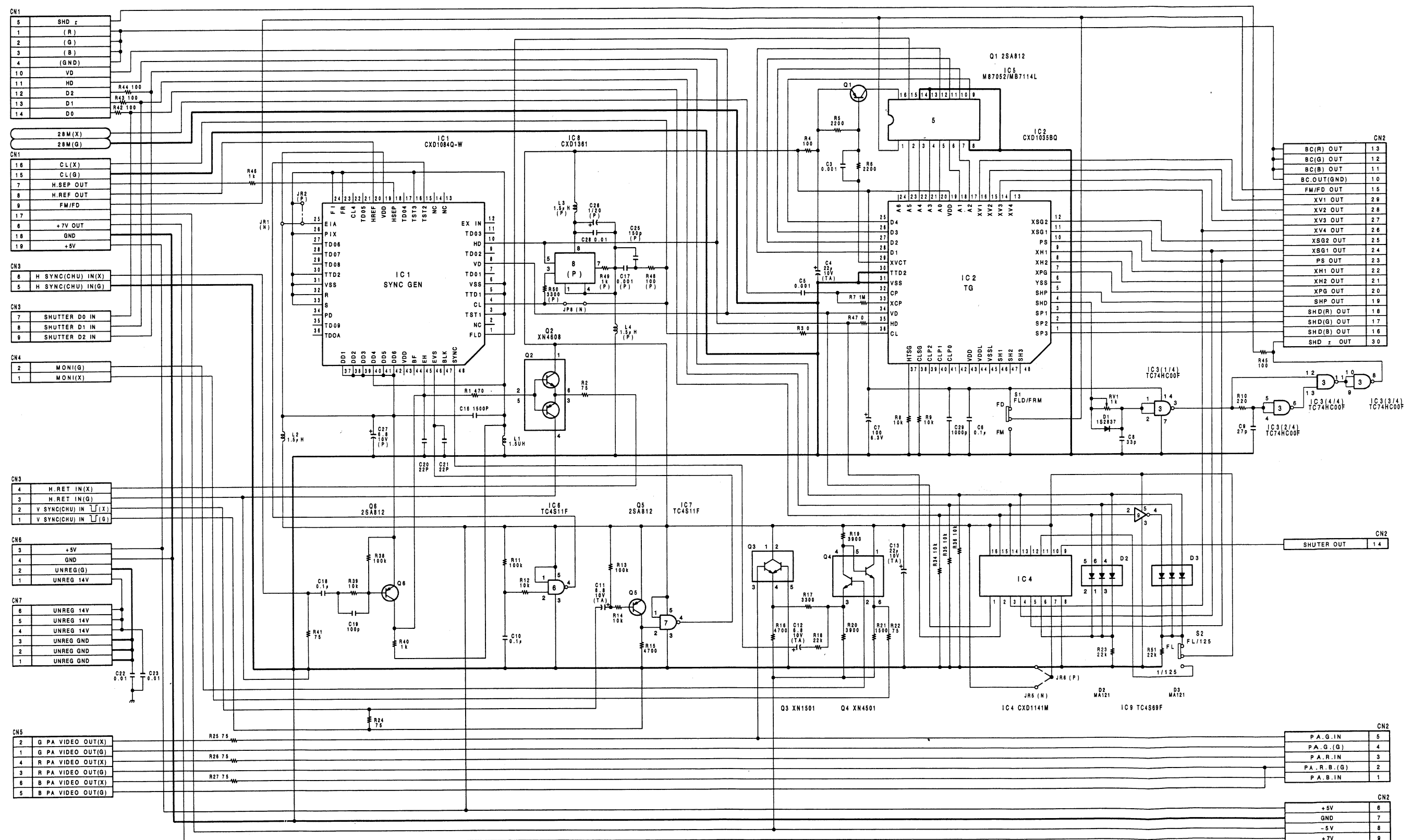
SOLDERING SIDE

CN1	D-6
CN2	A-4
CN3	E-3
CN4	E-6
CN5	A-5
CN6	F-1
CN7	E-6
D1	D-1
D2	E-2
IC2	B-3
IC6	C-4
IC8	D-4
Q2	E-5
Q3	E-5
Q4	E-5
Q6	E-3
RV1	D-1



TG-108 BOARD
— SOLDERING SIDE —
1-639-426-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

TG-108 BOARD



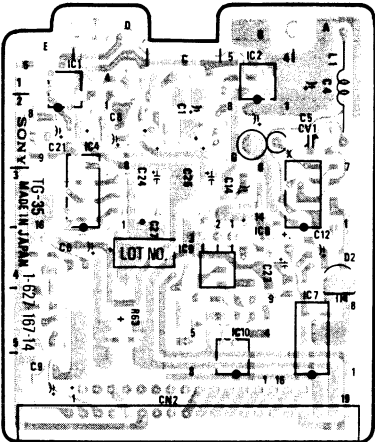
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

TG-108 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

TG-35 BOARD

COMPONENT SIDE (-14)

- | | |
|------|-----|
| CN2 | C-6 |
| CV1 | A-2 |
| D2 | A-4 |
| IC1 | E-1 |
| IC2 | B-1 |
| IC4 | D-3 |
| IC7 | A-5 |
| IC8 | A-3 |
| IC9 | C-3 |
| IC10 | B-5 |
| L1 | A-1 |



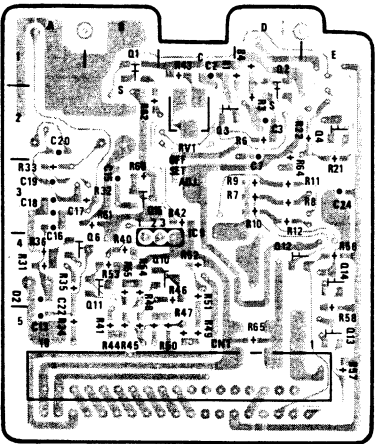
TG-35 BOARD

— COMPONENT SIDE —

1-627-167-14
 DXC-755 (UC, J)
 DXC-755P (EK)
 DXC-760MD (UC, J)

SOLDERING SIDE (-14)

- | | |
|-----|-----|
| CN1 | C-5 |
| IC9 | C-3 |
| Q1 | B-1 |
| Q2 | D-1 |
| Q3 | C-2 |
| Q4 | E-2 |
| Q6 | A-4 |
| Q10 | C-4 |
| Q11 | B-4 |
| Q12 | D-4 |
| Q13 | E-5 |
| Q14 | E-4 |
| Q15 | B-3 |
| RV1 | C-2 |



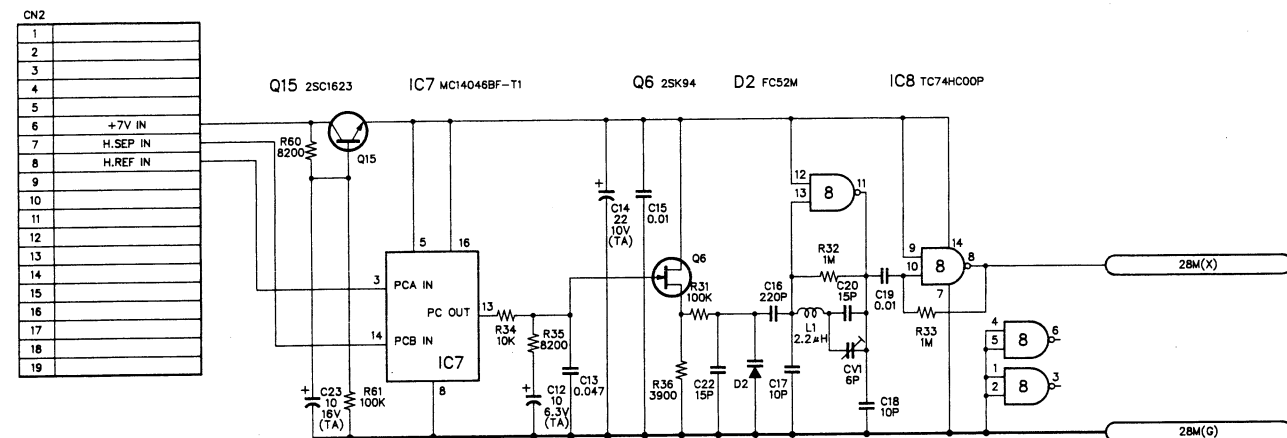
TG-35 BOARD

— SOLDERING SIDE —

1-627-167-14
 DXC-755 (UC, J)
 DXC-755P (EK)
 DXC-760MD (UC, J)

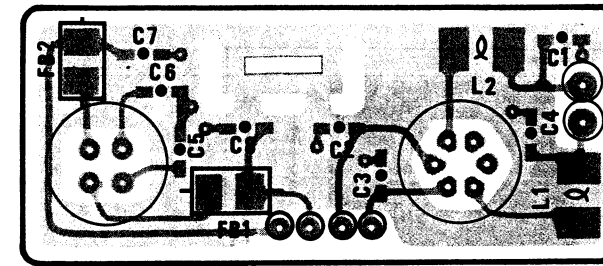
DXC-755 (UC, J)
 DXC-755P (EK)
 DXC-760MD (UC, J)

TG-35 BOARD

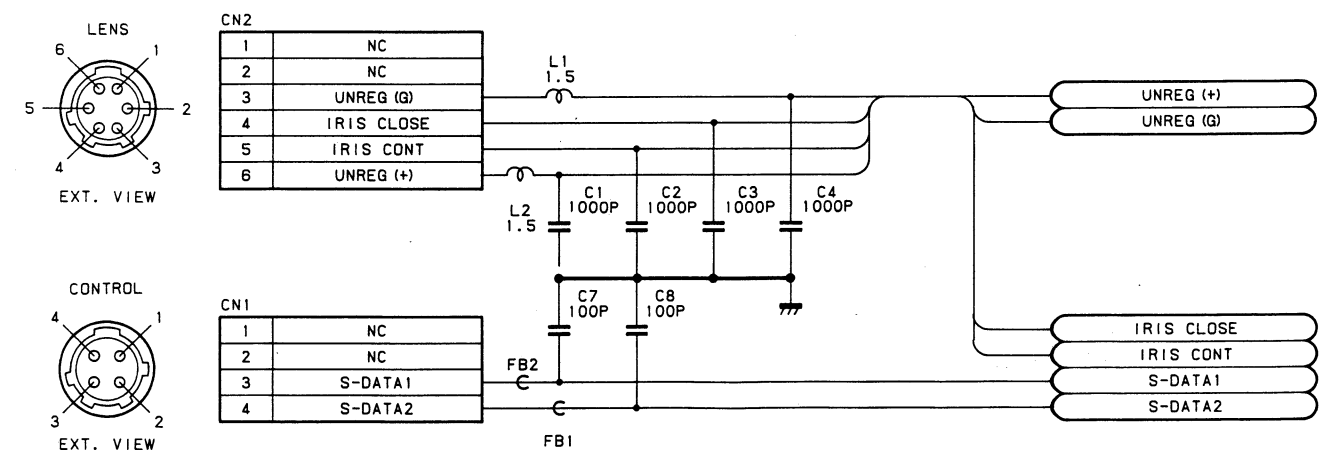


TG-35 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

CN-315 BOARD

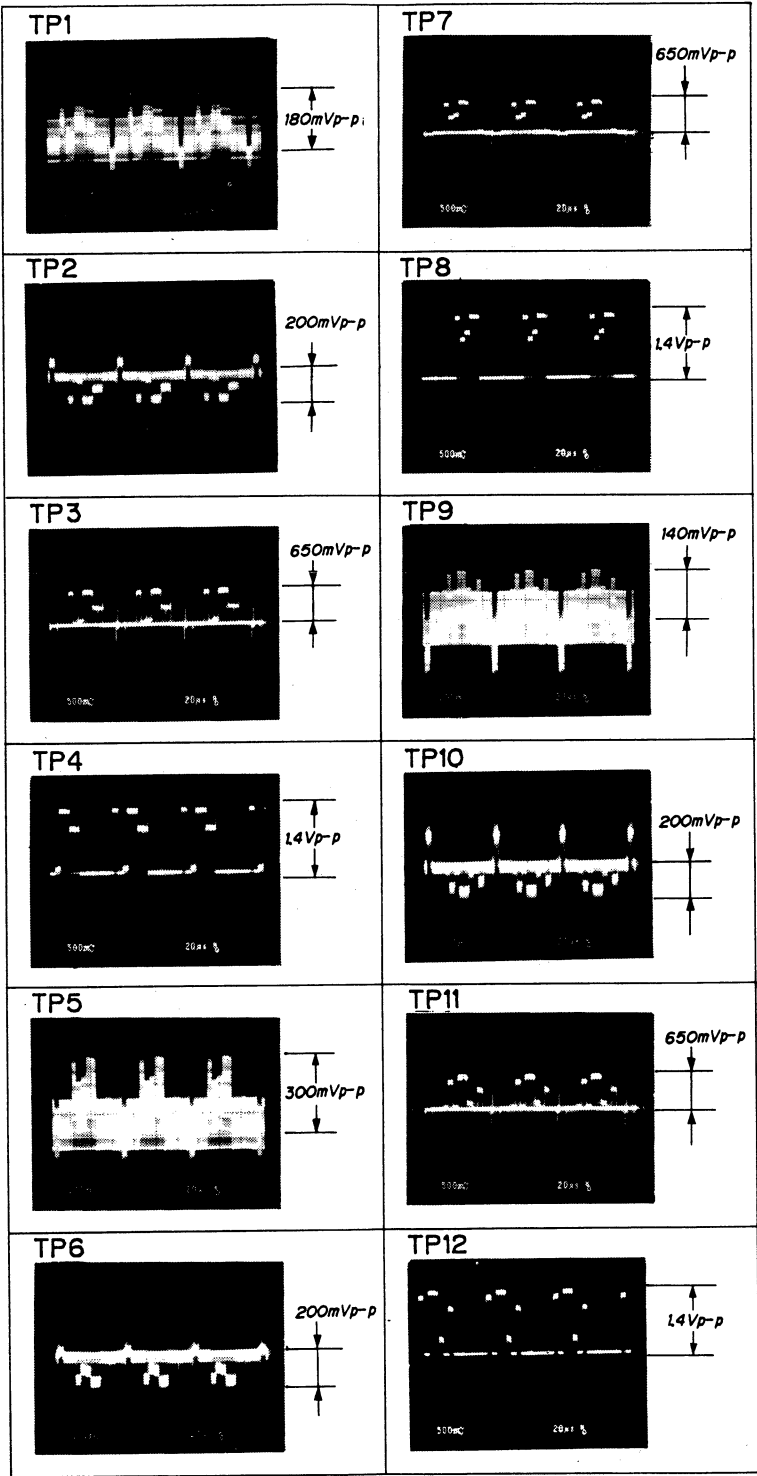
**CN-315** BOARD

—SOLDERING SIDE—
1-628-836-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



CN-315 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



注意:

1. DC電圧はデジタル電圧計(入力インピーダンス10MΩ)による値。
2. 波形写真及びDC電圧は下記条件で測定。
- ・フロントパネル
- COLOR TEMP : 3200K
- W/B BALANCE AUTO/MAN : AUTO
- GAIN : 0dB
- MASTER PED : 中央位置
- IRIS AUTO/MAN : AUTO
- GAIN : 0dB
- SHUTTER ON/OFF : OFF
- MODE : CAM
- DETAIL : 中央位置
- PHASE SC 0/180 : 0
- ・リアパネル
- GAMMA : ON
- LINEAR MATRIX : ON
- ・カラーバーを撮影

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

NOTE:

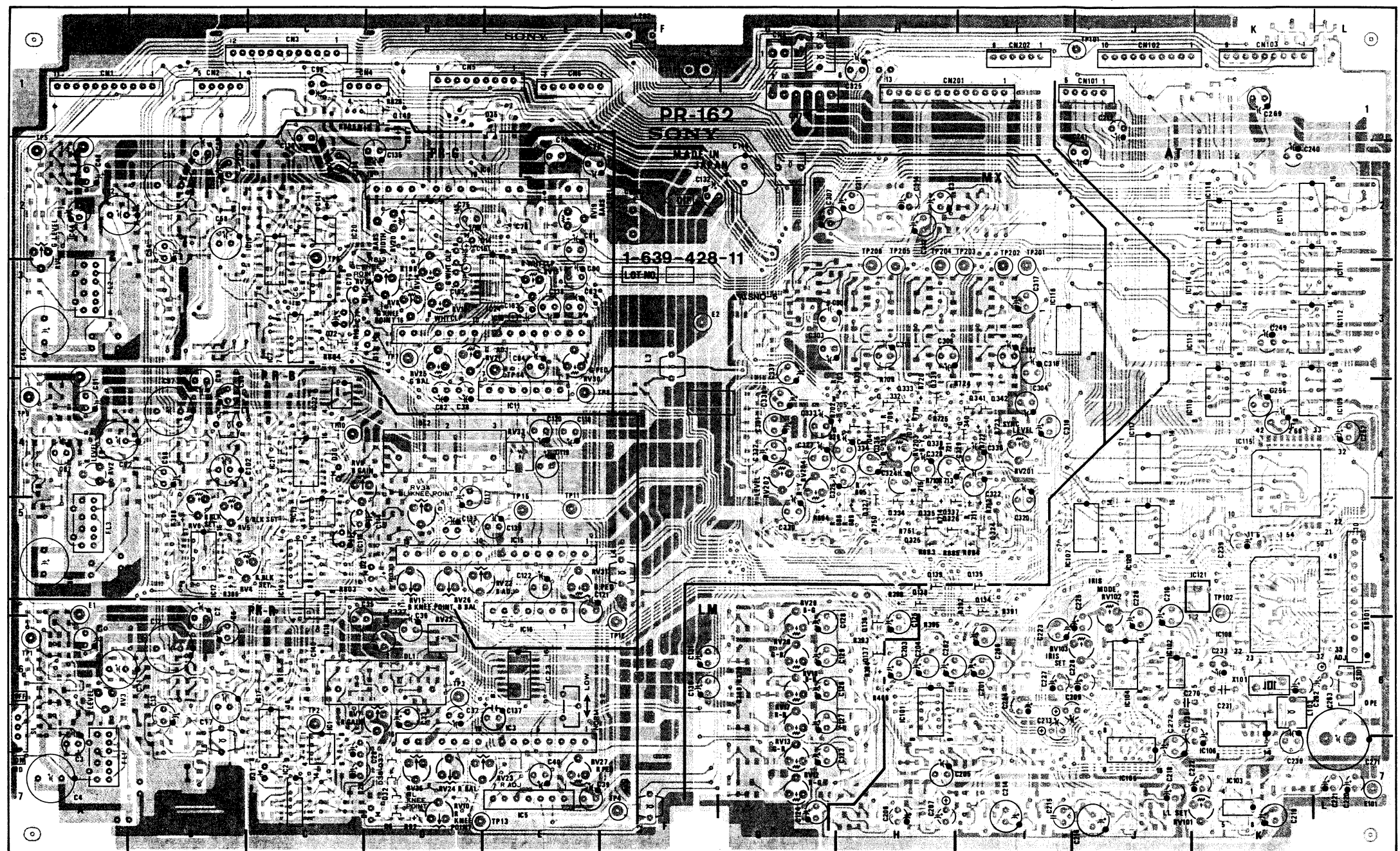
1. All voltage are dc, measured with a digital voltmeter. (input impedance:10MΩ)
2. All waveforms are taken and DC voltage is measured in condition below.
- ・FRONT PANEL
- COLOR TEMP : 3200K
- W/B BALANCE AUTO/MAN : AUTO
- GAIN : 0dB
- MASTER PED : mechanical center
- IRIS AUTO/MAN : AUTO
- GAIN : 0dB
- SHUTTER ON/OFF : OFF
- MODE : CAM
- DETAIL : mechanical center
- PHASE SC 0/180 : 0
- ・REAR PANEL
- GAMMA : ON
- LINEAR MATRIX : ON
- ・Shoot the color bar chart

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

PR-162 BOARD

CN1	A-1	IC118	K-2
CN2	B-1	IC119	K-2
CN3	C-1	IC120	J-5
CN4	C-1	IC121	K-5
CN5	D-1		
CN6	E-1	L1	G-2
CN7	G-1	L2	F-7
CN8	G-1	L3	F-3
CN101	J-1	L4	F-5
CN102	J-1	L5	B-7
CN103	K-1	L6	B-4
CN201	H-1	L103	K-6
CN202	I-1	L201	G-1
		L202	F-1
D5	D-7		
D6	D-7	Q72	C-3
D12	D-3	Q134	I-5
D14	D-2	Q135	I-5
D21	C-5	Q136	H-6
D30	C-4	Q137	H-6
D31	C-7	Q138	H-5
D32	D-7	Q139	H-5
D35	E-1	Q140	D-1
D37	D-7	Q324	I-5
D38	D-7	Q325	H-5
		Q326	H-5
DL1	D-6	Q327	H-5
DL2	D-4	Q329	G-4
		Q330	H-4
E1	A-5	Q331	H-4
E2	F-3	Q332	H-4
E3	A-2	Q333	H-4
E4	A-4	Q334	H-5
E101	L-7	Q335	H-5
		Q337	H-5
FL1	A-7	Q338	H-4
FL2	A-3	Q339	H-4
FL3	A-5	Q340	I-4
		Q341	I-4
		Q342	I-4
IC1	C-6		
IC2	C-7		
IC3	E-6	RV1	A-3
IC5	E-7	RV2	A-4
IC6	C-3	RV3	A-6
IC7	C-3	RV4	B-5
IC8	D-2	RV5	B-5
IC9	D-2	RV6	B-5
IC10	E-3	RV7	C-6
IC11	E-4	RV8	D-3
IC12	B-5	RV9	C-4
IC13	C-5	RV10	D-7
IC14	C-5	RV11	D-5
IC15	E-5	RV12	G-7
IC16	E-6	RV13	G-7
IC17	C-6	RV14	D-3
IC18	C-6	RV15	E-3
IC19	C-2	RV16	D-3
IC20	C-2	RV17	G-6
IC21	C-4	RV18	G-6
IC22	C-4	RV19	E-2
IC23	E-6	RV20	D-2
IC24	E-3	RV21	E-3
IC101	H-6	RV22	E-5
IC102	J-6	RV23	E-7
IC103	K-7	RV24	D-7
IC104	J-6	RV25	D-3
IC105	J-7	RV26	D-5
IC106	K-7	RV27	E-7
IC107	I-5	RV28	G-6
IC108	K-6	RV29	G-6
IC109	L-4	RV30	E-4
IC110	J-4	RV31	E-5
IC111	L-3	RV32	D-6
IC112	L-3	RV33	E-4
IC113	J-3	RV34	D-4
IC114	J-3	RV35	D-7
IC115	K-4	RV36	C-3
IC116	I-3	RV101	J-7
IC117	J-4	RV102	J-5
		RV103	I-6
		RV201	I-4

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



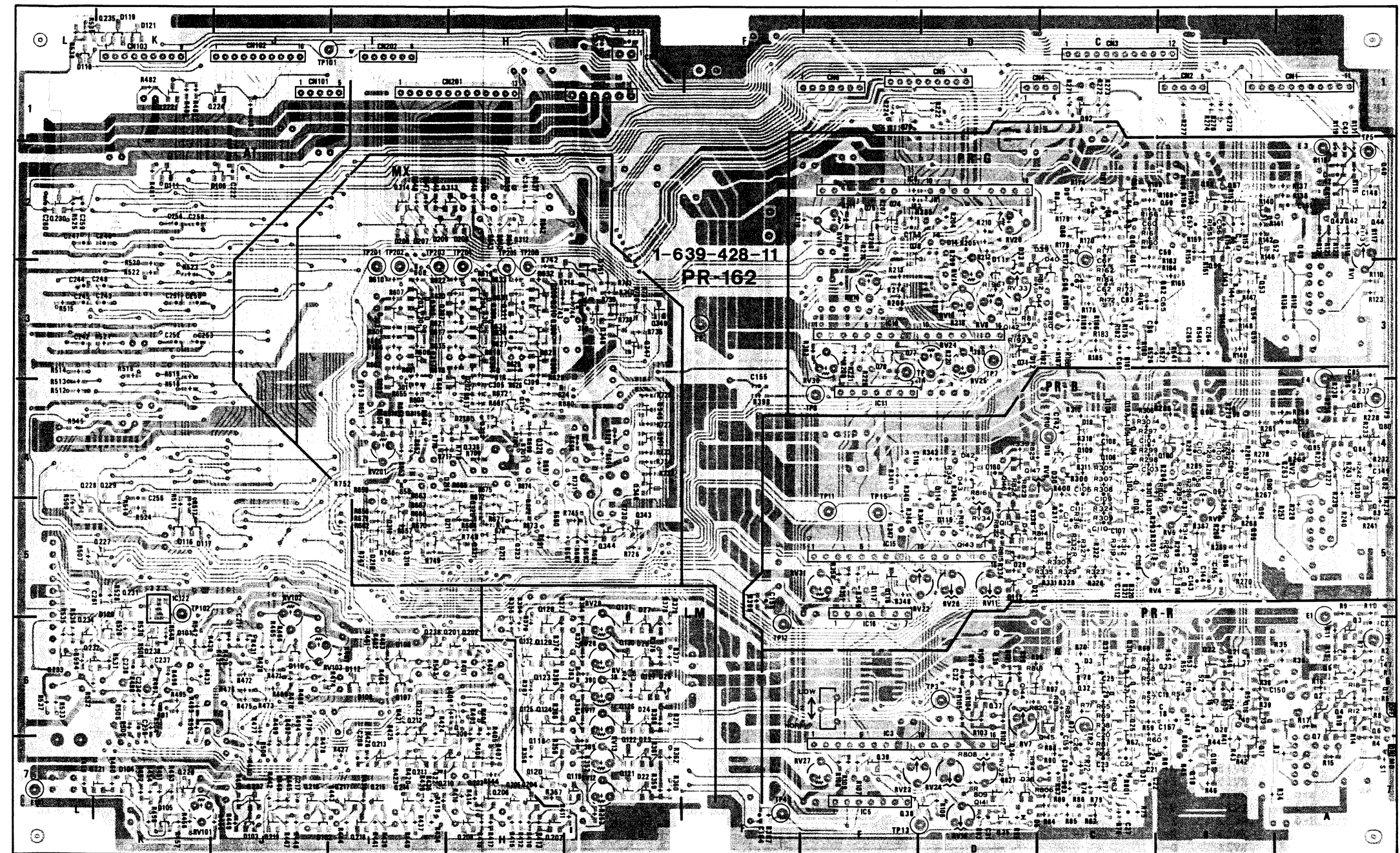
RV202	G-4	TP7	D-3	RB101	L-6
RV203	H-4	TP8	E-4		
RV204	G-4	TP9	A-4	X101	K-6
		TP10	C-4		
S1	A-7	TP11	E-5		
S2	F-6	TP12	F-6		
S101	L-6	TP13	E-7		
		TP14	E-3		
TP1	A-6	TP15	E-5		
TP2	C-6	TP101	J-1		
TP3	D-6	TP102	K-5		
TP4	F-7	TP201	I-2		
TP5	A-2	TP202	I-2		
TP6	C-2	TP203	I-2		
		TP204	H-2		
		TP205	H-2		
		TP206	H-2		

PR-162 BOARD

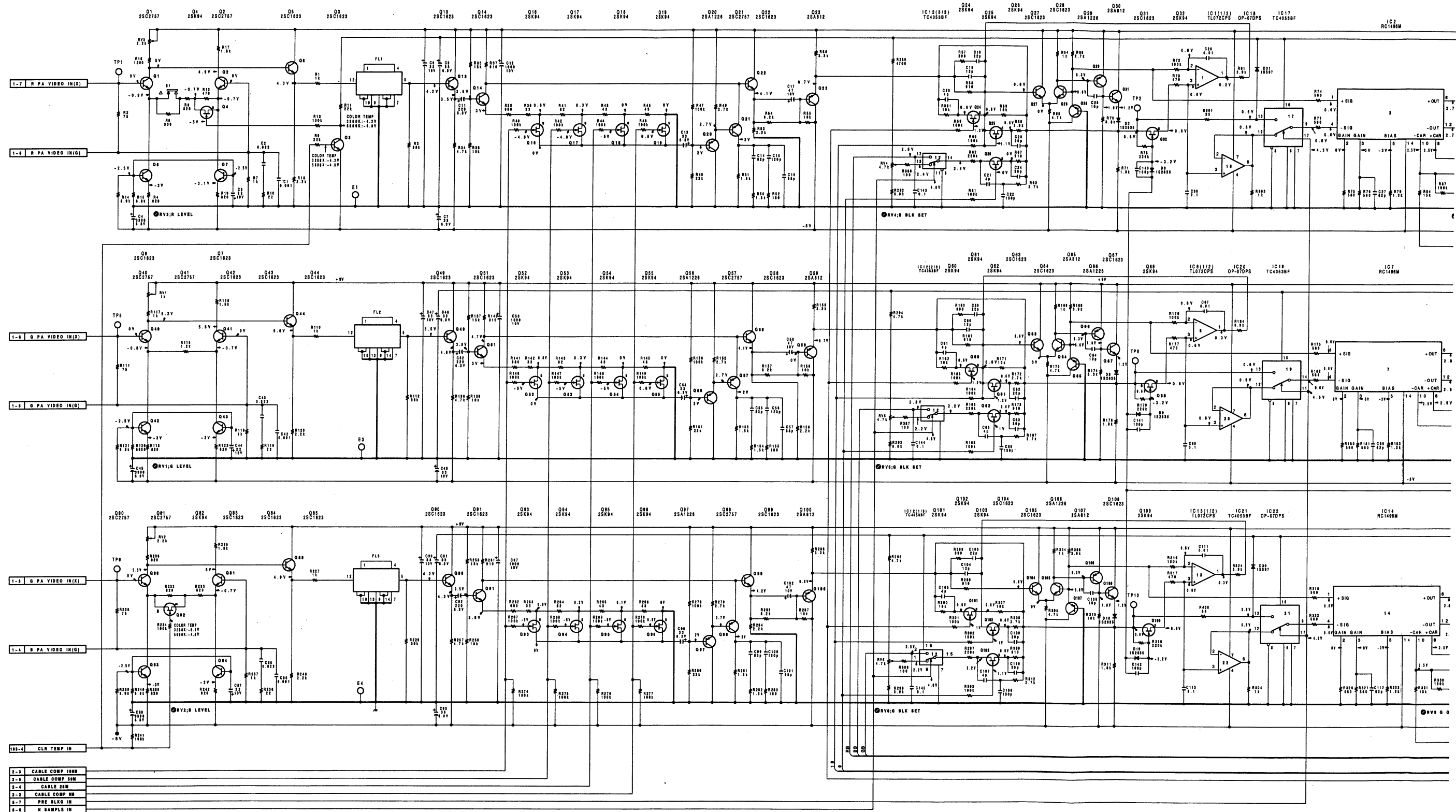
— COMPONENT SIDE —
1-639-428-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PR-162 BOARD

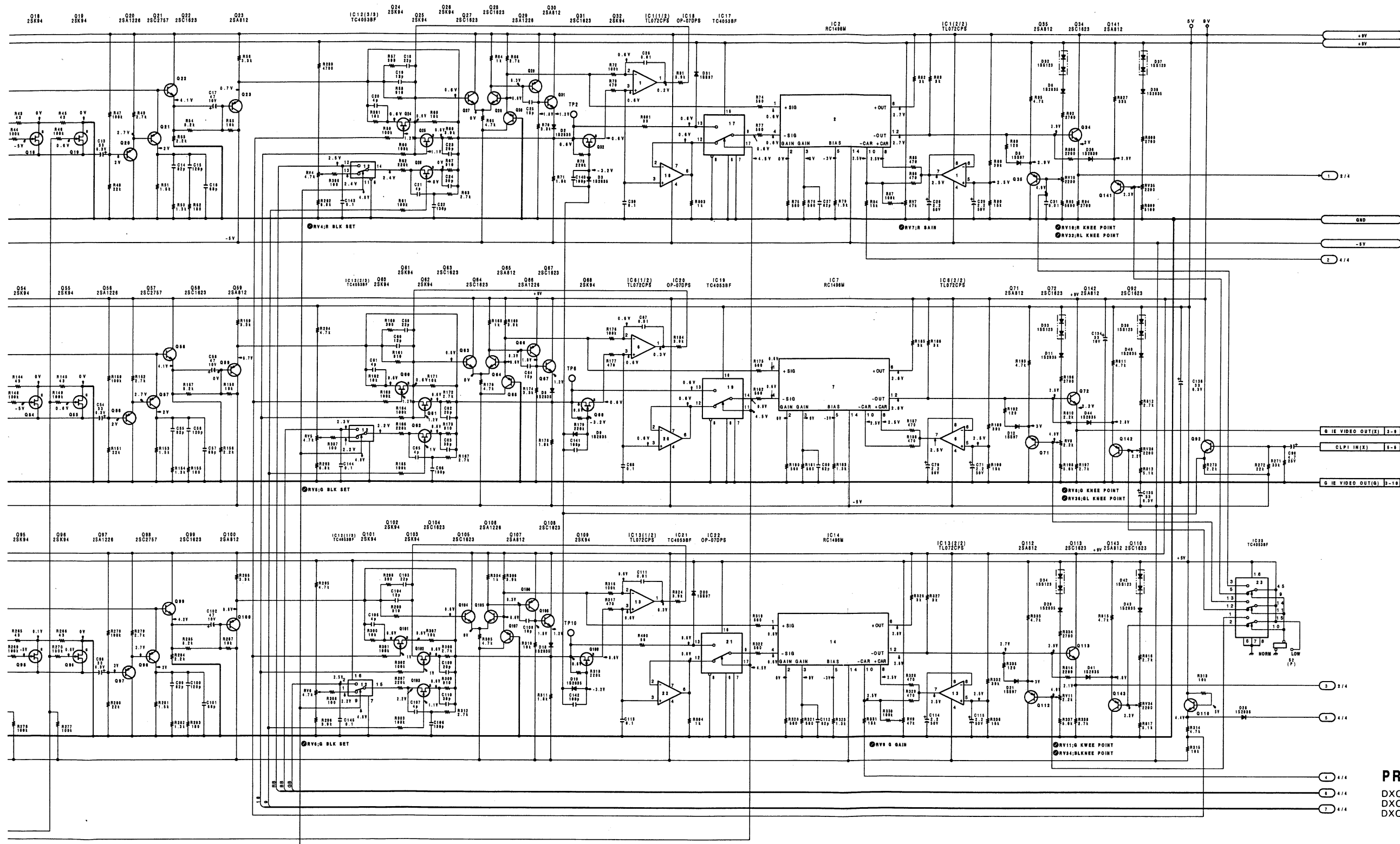
CN1	A-1	E1	A-5	Q78	E-3
CN2	B-1	E2	F-3	Q79	E-1
CN3	C-1	E3	A-2	Q80	A-4
CN4	C-1	E4	A-4	Q81	A-4
CN5	D-1	E101	L-7	Q82	A-4
CN6	E-1			Q83	A-5
CN7	G-1	JR1	D-2	Q84	A-4
CN8	G-1	JR2	E-2	Q85	A-4
CN101	J-1	JR3	G-6	Q90	B-4
CN102	J-1	JR4	G-6	Q91	B-4
CN103	K-1			Q92	C-1
CN201	H-1	IC3	E-7	Q93	B-4
CN202	I-1	IC5	E-7	Q94	B-5
		IC9	E-2	Q95	B-5
D2	C-6	IC10	E-3	Q96	B-5
D3	C-6	IC11	E-4	Q97	B-4
D6	D-7	IC15	E-5	Q98	B-4
D8	C-2	IC16	E-6	Q99	B-4
D9	C-2	IC122	K-5	Q100	B-4
D11	D-2			Q101	C-4
D12	D-3	Q1	A-6	Q102	C-4
D14	D-2	Q2	A-6	Q103	C-4
D18	C-4	Q3	A-6	Q104	C-4
D19	C-4	Q4	A-6	Q105	C-4
D21	D-5	Q5	A-6	Q106	C-4
D22	G-7	Q6	A-6	Q107	C-4
D23	G-7	Q7	A-6	Q108	C-4
D24	G-6	Q13	B-6	Q109	C-4
D25	G-6	Q14	B-6	Q110	B-5
D26	G-6	Q16	B-6	Q112	D-5
D27	G-5	Q17	B-7	Q113	D-5
D28	B-5	Q18	B-7	Q114	D-5
D29	D-5	Q19	B-7	Q115	D-5
D30	C-4	Q20	B-6	Q116	E-5
D31	C-7	Q21	B-6	Q117	E-5
D33	D-2	Q22	B-6	Q118	H-7
D34	C-5	Q23	B-6	Q119	G-7
D36	D-7	Q24	C-6	Q120	H-7
D39	C-2	Q25	C-6	Q121	G-7
D40	C-2	Q26	C-7	Q122	G-7
D41	D-5	Q27	C-6	Q123	H-6
D44	C-3	Q28	C-6	Q124	H-6
D101	K-6	Q29	C-6	Q125	H-6
D102	J-7	Q30	C-6	Q126	G-6
D103	J-7	Q31	C-6	Q127	G-6
D104	K-7	Q32	C-6	Q128	H-5
D105	K-7	Q34	D-7	Q129	H-6
D106	J-2	Q35	D-7	Q130	G-6
D107	I-6	Q36	D-6	Q131	G-5
D108	I-6	Q37	D-6	Q132	H-6
D109	I-6	Q38	E-7	Q141	D-7
D110	J-6	Q39	E-7	Q142	D-3
D111	K-2	Q40	A-2	Q143	D-5
D112	I-6	Q41	A-2	Q144	D-6
D116	K-5	Q42	A-2	Q145	C-6
D117	K-5	Q43	A-2	Q146	D-3
D118	L-1	Q44	A-2	Q147	D-3
D119	K-1	Q49	A-2	Q201	H-6
D120	K-5	Q51	B-2	Q202	H-6
D121	K-1	Q52	B-2	Q203	H-7
D122	I-6	Q53	B-3	Q204	H-7
D201	I-4	Q54	B-3	Q205	H-7
D202	H-4	Q55	B-3	Q206	H-7
D203	I-3	Q56	B-3	Q207	H-7
D204	H-3	Q57	B-2	Q208	H-7
D205	H-3	Q58	B-2	Q209	H-6
D206	I-2	Q59	B-2	Q210	I-7
D207	I-2	Q60	C-2	Q211	I-7
D208	H-2	Q61	C-2	Q212	I-6
D209	I-2	Q62	B-2	Q213	I-7
D210	I-5	Q63	C-2	Q214	I-7
D211	H-5	Q64	C-2	Q215	I-7
D212	H-5	Q65	C-2	Q216	I-7
D213	H-4	Q66	C-2	Q217	I-7
D214	H-4	Q67	C-2	Q218	J-7
D215	H-4	Q68	C-2	Q219	J-7
D216	H-4	Q71	D-3	Q220	K-7
D217	G-4	Q74	E-2	Q221	K-7
D218	G-3	Q75	E-2	Q222	K-1
		Q76	E-2	Q224	J-1
		Q77	E-3	Q227	K-5



PR-162(1/4)BOARD

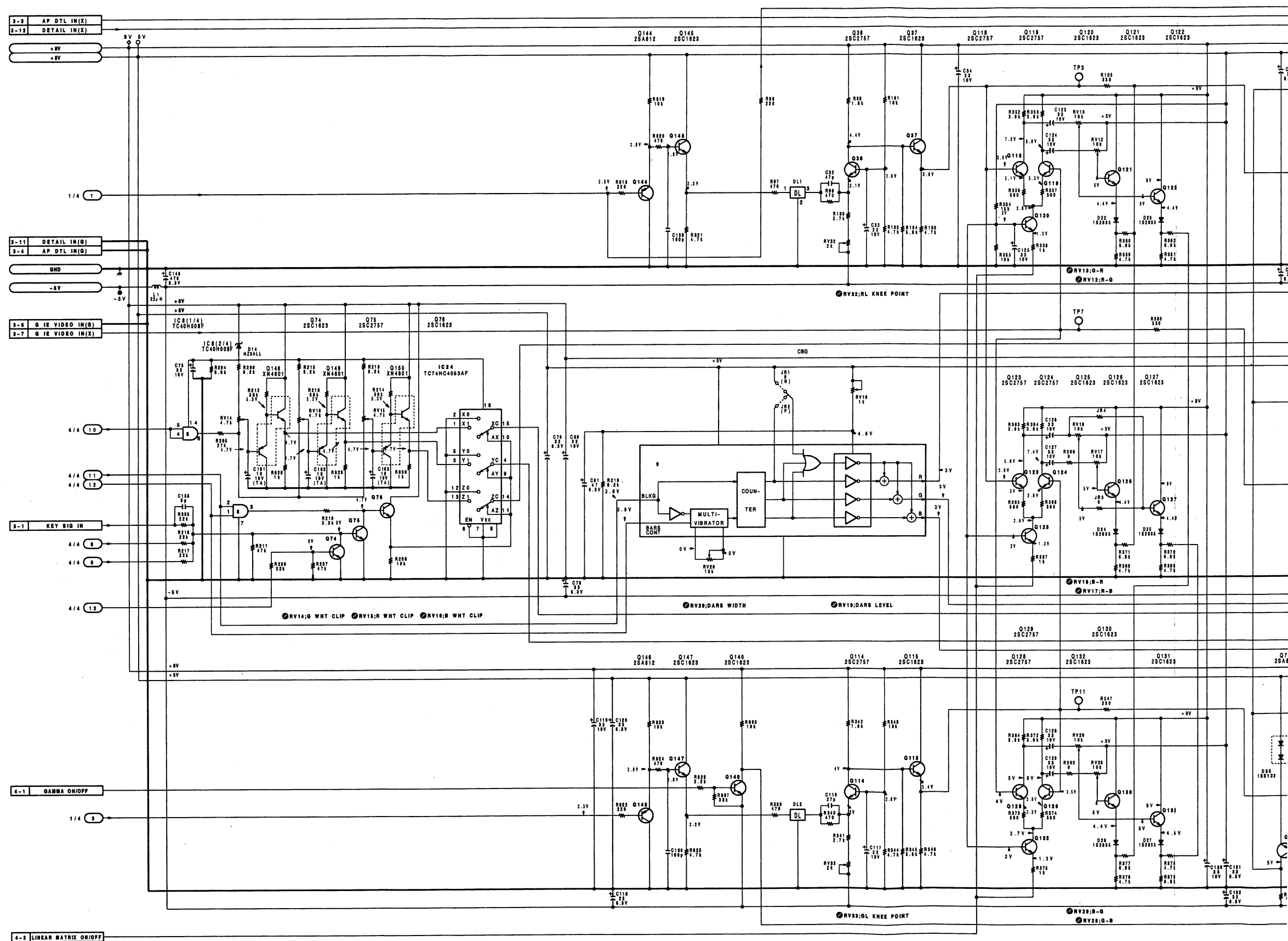


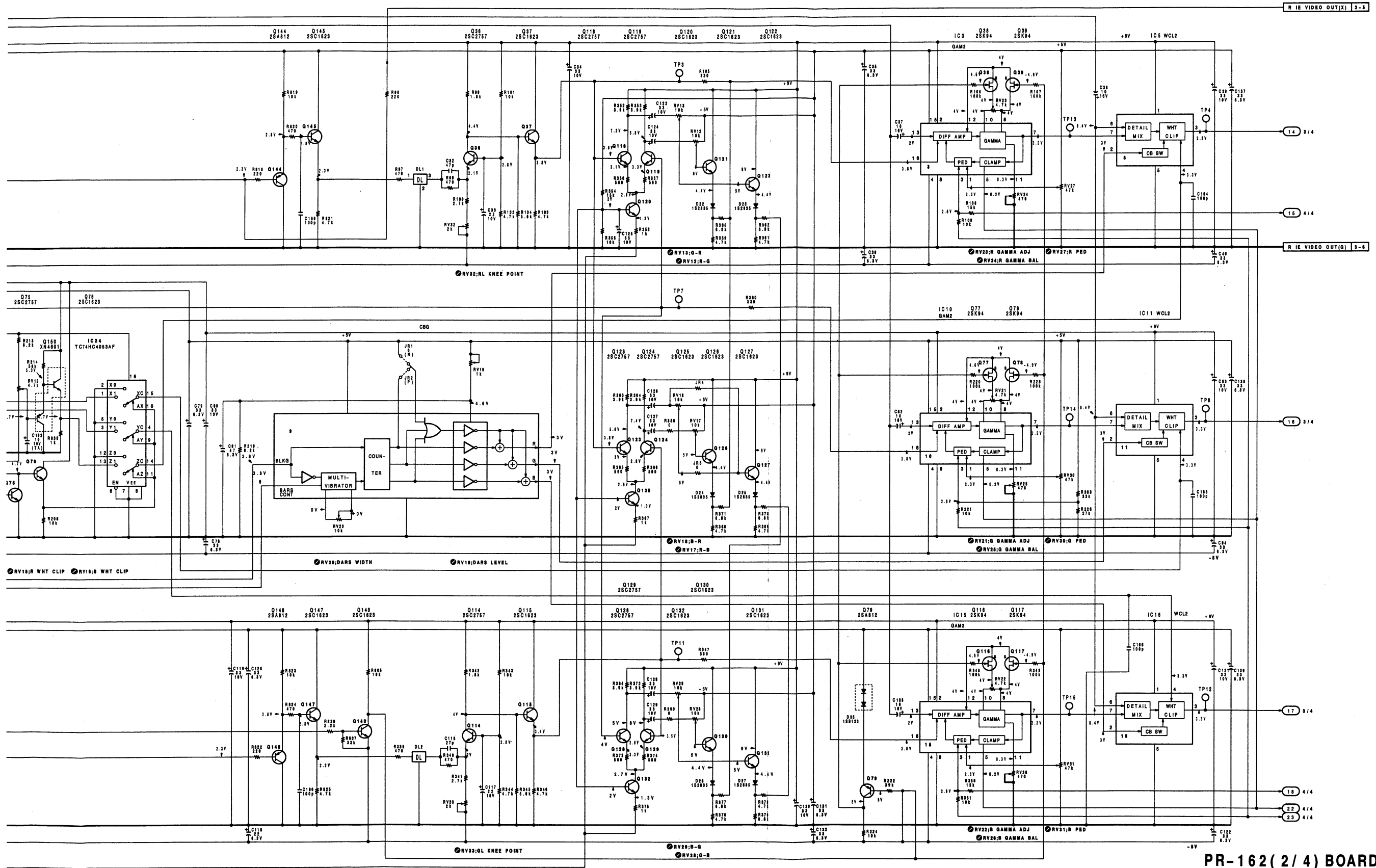
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



PR-162 (1 / 4) BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PR-162(2/4)BOARD



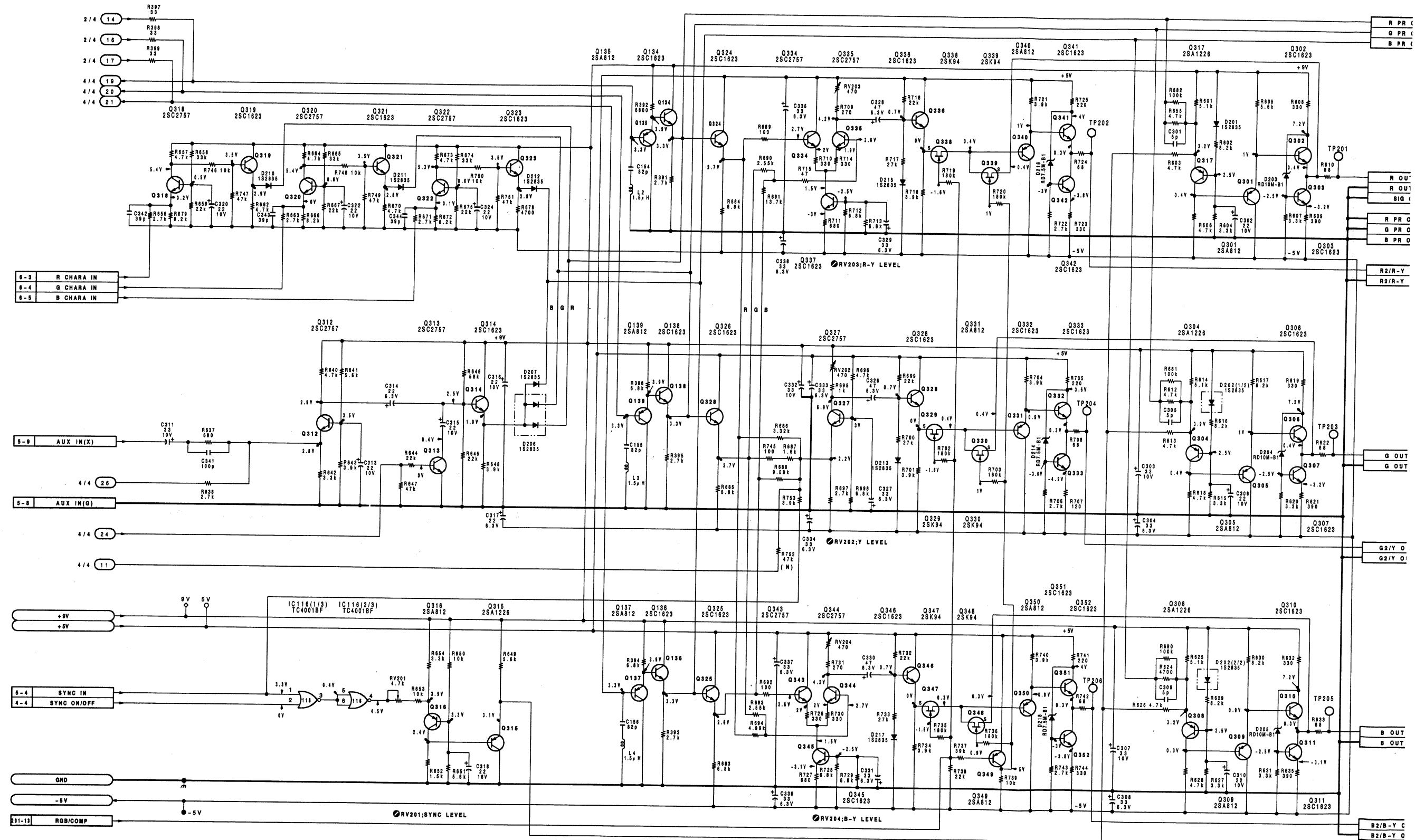


PR-162(2/4) BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

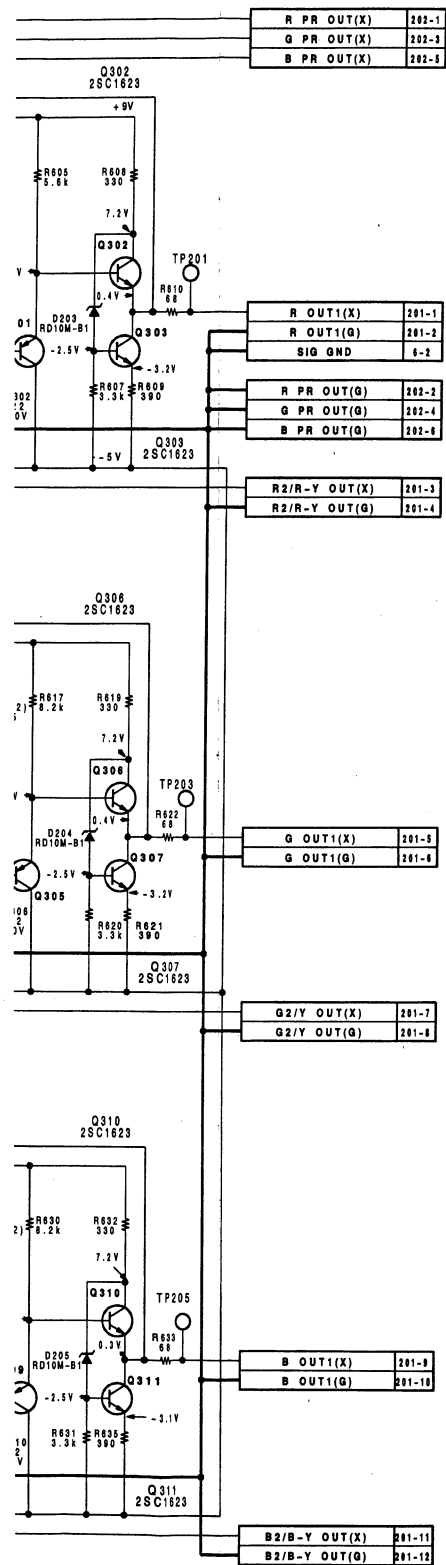
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PR-162(3/4)BOARD



PR-162(3/4) E

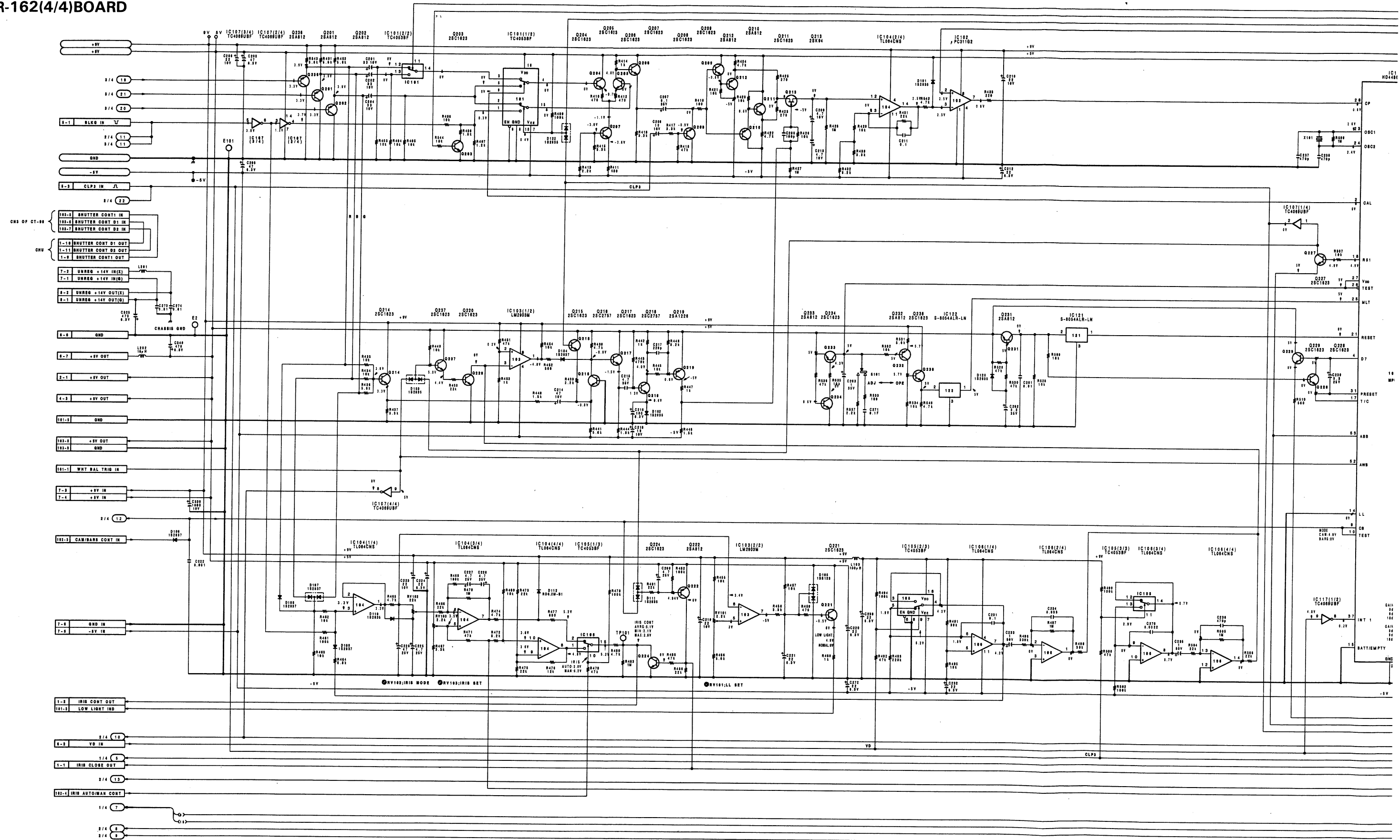
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

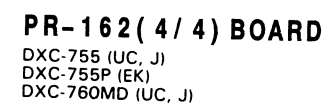


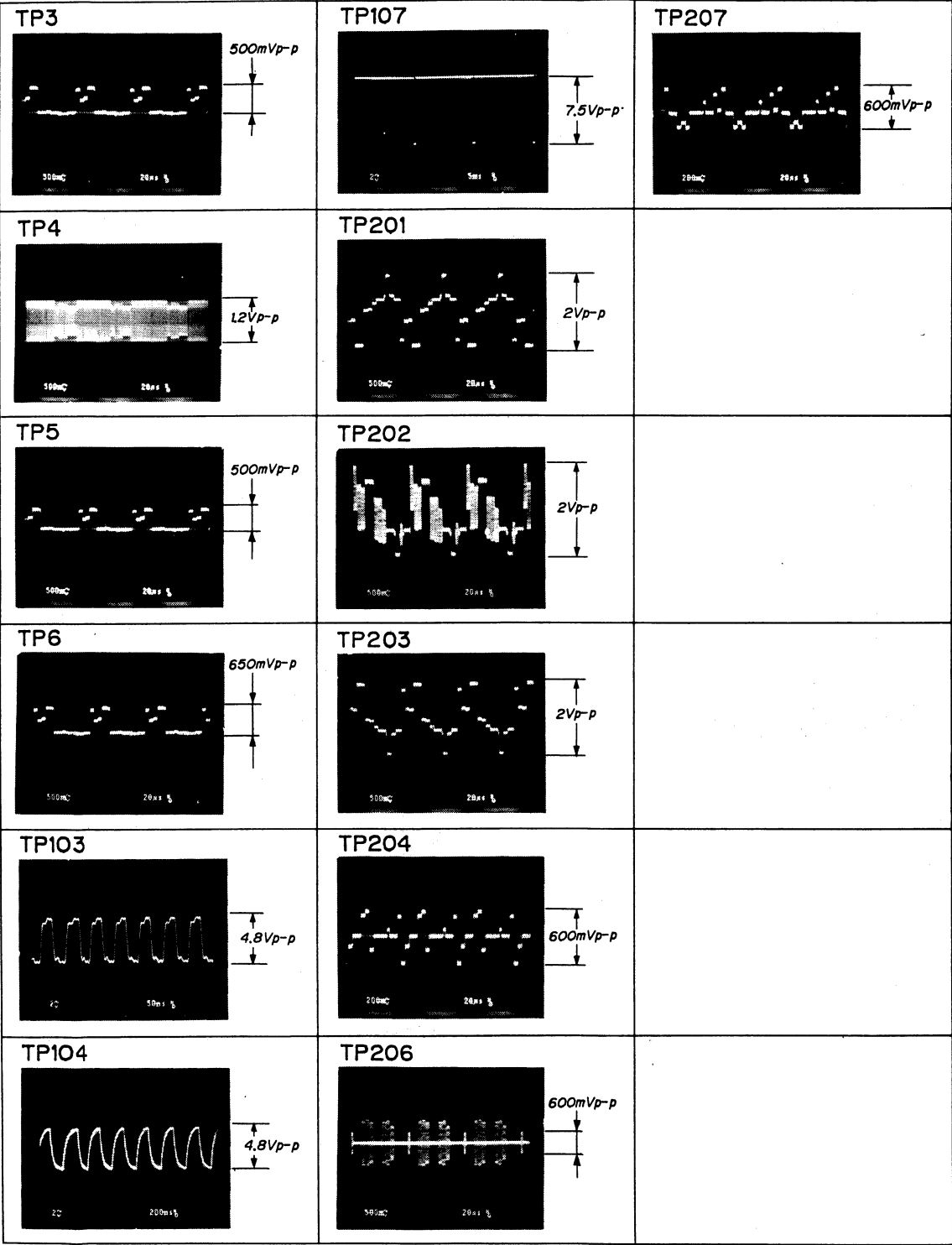
PR-162(3/4) BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

PR-162(4/4)BOARD







注意：

1. DC電圧はデジタル電圧計(入力インピーダンス10MΩ)による値。

2. 波形写真及びDC電圧は下記条件で測定。

・フロントパネル

COLOR TEMP : 3200K

W/B BALANCE AUTO/MAN : AUTO

GAIN : 0dB

MASTER PED : 中央位置

IRIS AUTO/MAN : AUTO

GAIN : 0dB

SHUTTER ON/OFF : OFF

MODE : CAM

DETAIL : 中央位置

PHASE SC 0/180 : 0

・リアパネル

GAMMA : ON

LINEAR MATRIX : ON

・カラーバーを撮影

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

NOTE :

1. All voltage are dc, measured with a digital voltmeter. (input impedance : 10MΩ)

2. All waveforms are taken and DC voltage is measured in condition below.

・FRONT PANEL

COLOR TEMP : 3200K

W/B BALANCE AUTO/MAN : AUTO

GAIN : 0dB

MASTER PED : mechanical center

IRIS AUTO/MAN : AUTO

GAIN : 0dB

SHUTTER ON/OFF : OFF

MODE : CAM

DETAIL : mechanical center

PHASE SC 0/180 : 0

・REAR PANEL

GAMMA : ON

LINEAR MATRIX : ON

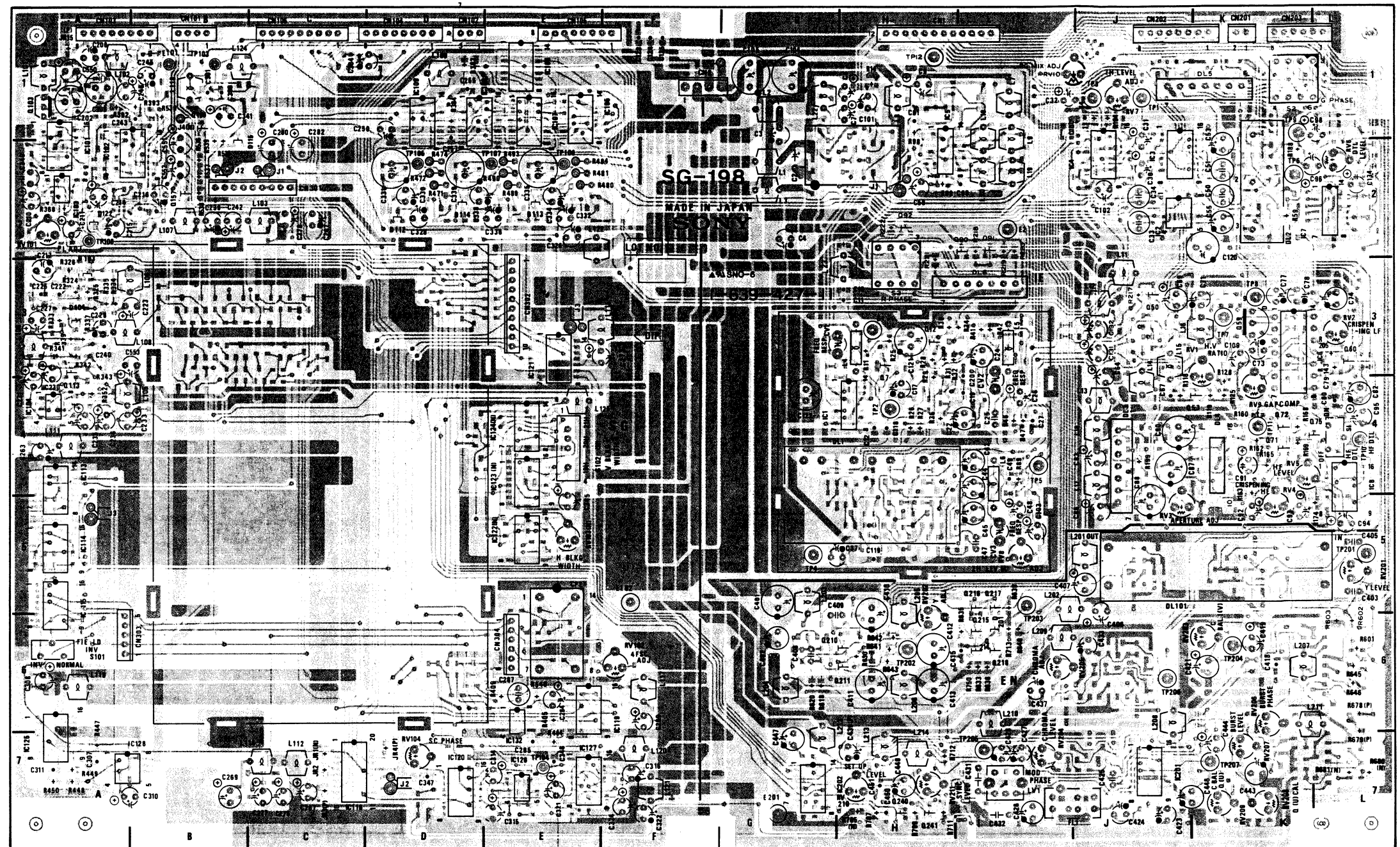
・Shoot the color bar chart

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

SG-198 BOARD

CN1	H-1	J1	C-2
CN2	F-1	J1	H-2
CN101	B-1	J2	B-2
CN102	D-1	J2	D-7
CN103	A-1	J3	A-5
CN104	D-1	J3	E-3
CN105	E-1	J4 (N)	B-1
CN106	C-1	J4 (N)	F-1
CN201	K-1		
CN202	J-1	JR1 (N)	C-7
CN203	K-1	JR2	C-7
CN301	C-2	JR3 (P)	C-7
CN302	E-3	JR4 (P)	D-7
CN303	A-6	JR15	A-1
CN304	E-6		
CP2	E-5	L1	G-2
CV1	G-3	L2	G-1
CV2	I-4	L3	G-2
		L4	H-3
		L5	I-3
		L6	I-4
		L7	I-1
D103	A-2	L8	H-1
D104	A-3	L9	I-1
D112	D-2	L10	I-1
D113	E-2	L11	J-3
D114	D-2	L12	J-3
D115	C-2	L13	J-4
D122	A-2	L14	J-4
D201	I-6	L15	J-3
		L17	J-4
DL1	H-4	L18	J-4
DL2	K-2	L19	I-2
DL3	J-4	L20	I-2
DL4	K-4	L22	G-1
DL5	K-1	L23	H-2
DL6	I-2	L101	A-1
DL101	J-5	L102	A-1
		L103	C-2
E1	H-3	L104	B-3
E2	I-2	L105	B-4
E101	B-1	L106	A-3
E102	F-5	L107	B-2
E201	G-7	L108	B-3
		L109	D-1
FL1	I-7	L111	A-4
		L112	C-7
IC1	H-4	L114	C-7
IC2	J-2	L115	F-3
IC3	J-2	L117	F-6
IC5	H-2	L118	B-1
IC6	L-3	L119	A-6
IC7	K-2	L120	F-7
IC8	L-4	L121	F-7
IC101	A-2	L122	E-2
IC102	A-2	L124	B-1
IC103	A-2	L125	E-4
IC104	A-4	L201	J-5
IC105	E-1	L202	I-5
IC106	E-1	L203	G-5
IC107	E-1	L204	G-6
IC108	D-1	L205	H-5
IC109	D-1	L206	H-6
IC113	A-4	L207	K-6
IC114	A-5	L209	I-6
IC115	A-5	L210	I-6
IC116	C-7	L211	K-6
IC119	E-6	L212	G-7
IC120	D-7	L213	H-7
IC121	E-3	L214	H-7
IC122 (N)	E-5		
IC123 (N)	E-4		
IC124 (N)	E-4		
IC125	A-7	LV1	I-7
IC126	E-7		
IC127	E-7	Q7	H-3
IC128	A-7	Q12	H-3
IC132	E-6	Q50	J-3
IC201	J-7	Q53	K-4
IC202	G-7	Q59	K-3
		Q60	L-3
		Q71	K-4
		Q72	K-4
		Q75	L-4

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



Q90	I-2	RAT10	K-3	RV202	H-5	TP1	J-1	TP107	D-2
Q91	I-2			RV203	K-6	TP2	H-4	TP108	A-2
Q92	H-2	RV1	K-3	RV204	I-7	TP3	J-1	TP201	L-5
Q103	A-1	RV2	L-3	RV205	J-6	TP4	G-5	TP202	H-6
Q113	A-4	RV3	J-5	RV206	J-6	TP5	I-4	TP203	I-5
Q156	B-1	RV4	K-4	RV207	K-7	TP6	K-2	TP204	K-6
Q157	B-2	RV5	K-4	RV208	K-7	TP7	K-3	TP205	I-7
Q210	G-6	RV6	L-1	RV209	K-7	TP8	K-3	TP206	J-6
Q211	H-6	RV7	J-1	RV210	H-7	TP9	K-1	TP207	K-7
Q214	I-6	RV9	K-4	RV211	H-7	TP10	L-4		
Q215	I-6	RV10	I-1			TP11	K-4		
Q216	I-5	RV101	A-2	S2	K-1	TP12	H-1		
Q217	I-5	RV102	F-6	S3	H-3	TP103	B-1		
Q218	I-6	RV103 (N)	E-5	S101	A-6	TP104	E-7		
Q240	H-7	RV104	D-7	S102	E-4	TP105	D-2		
Q241	H-7	RV201	L-5			TP106	E-2		

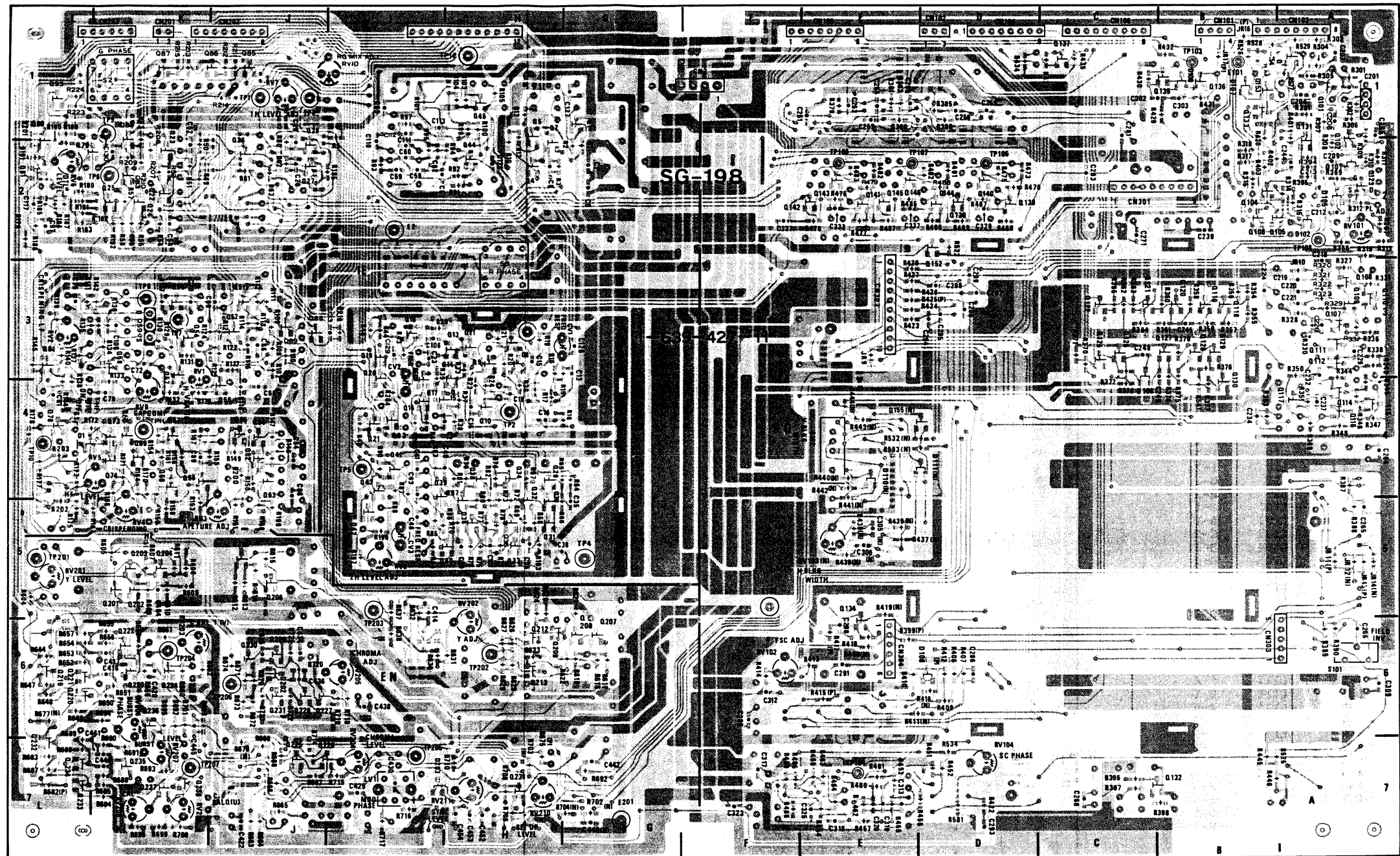
SG-198 BOARD

— COMPONENT SIDE —
1-639-427-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198 BOARD

CN1	H-1	Q40	H-5
CN2	F-1	Q41	I-4
CN101	B-1	Q42	I-5
CN102	D-1	Q43	I-4
CN103	A-1	Q44	H-2
CN104	D-1	Q45	H-1
CN105	E-1	Q51	J-3
CN106	C-1	Q52	J-3
CN201	K-1	Q54	K-3
CN202	J-1	Q55	J-4
CN203	K-1	Q56	K-3
CN301	C-2	Q57	K-3
CN302	E-3	Q58	K-3
CN303	A-6	Q59	K-3
CN304	E-6	Q61	L-3
		Q62	J-4
CV1	G-3	Q63	J-4
CV2	I-3	Q64	J-4
CV3	I-5	Q65	J-4
		Q66	K-4
D1	L-4	Q67	K-4
D101	A-2	Q68	K-4
D102	A-2	Q69	K-4
D105	A-2	Q70	K-4
D106	C-4	Q73	K-4
D107	B-1	Q74	K-4
D108	D-6	Q78	L-4
D109	B-1	Q79	L-2
D110(N)	E-4	Q80	L-1
D111(N)	D-4	Q81	L-2
D202	J-6	Q82	I-4
D203	I-7	Q83	K-2
		Q84	K-1
E1	H-3	Q85	J-1
E2	I-2	Q86	J-1
E101	B-1	Q87	K-1
E102	F-5	Q88	J-3
E201	G-7	Q89	J-3
		Q93	L-1
JR9	E-3	Q101	A-1
JR10	A-3	Q102	A-2
JR11(P)	A-5	Q104	B-2
JR12(N)	A-5	Q105	B-2
JR13(P)	A-5	Q106	B-2
JR14(N)	A-5	Q107	A-3
JR16(P)	B-1	Q108	A-3
JR17(P)	E-3	Q109	A-3
		Q110	A-3
LV1	I-7	Q111	A-3
		Q112	A-3
Q1	G-1	Q114	A-4
Q2	H-1	Q116	A-4
Q4	H-2	Q117	A-4
Q5	H-1	Q118	B-3
Q6	H-3	Q119	B-3
Q8	H-3	Q120	B-3
Q9	H-3	Q121	C-3
Q10	H-4	Q122	C-3
Q11	H-3	Q123	A-2
Q13	H-3	Q125	C-3
Q14	H-3	Q126	C-3
Q15	H-4	Q127	B-3
Q16	I-4	Q128	B-3
Q17	I-4	Q129	B-3
Q18	I-3	Q130	B-4
Q19	I-3	Q131	A-1
Q20	I-3	Q132	B-7
Q21	I-4	Q133	B-1
Q22	K-2	Q134	E-5
Q23	K-1	Q135	B-1
Q24	K-2	Q136	B-1
Q25	K-2	Q137	C-1
Q26	J-2	Q138	D-2
Q27	J-2	Q139	D-2
Q28	J-1	Q140	D-2
Q31	H-5	Q141	E-2
Q32	H-4	Q142	F-1
Q33	H-5	Q143	E-2
Q34	H-4	Q144	D-2
Q35	H-5	Q145	E-2
Q36	H-5	Q146	E-2
Q37	H-4	Q152	D-3
Q38	H-4	Q153	B-1
Q39	I-4	Q154	A-1

Q155(N)	E-4	Q226	J-7	RV5	K-4	RV211	H-7	TP12	H-1
Q201	K-5	Q227	J-6	RV6	L-2			TP103	B-1
Q202	K-5	Q228	J-6	RV7	J-1	S1	L-4	TP104	E-7
Q203	K-5	Q229	J-6	RV8	I-5	S2	K-1	TP105	D-2
Q204	K-5	Q230	J-6	RV9	K-4	S3	H-3	TP106	E-2
Q205	J-5	Q231	J-6	RV101	A-2	S101	A-6	TP107	E-2
Q206	J-5	Q232	L-7	RV102	F-6	S102	E-4	TP108	A-2
Q207	G-6	Q233	L-7	RV103(N)	E-5			TP201	L-5
Q208	G-6	Q234	L-7	RV104	D-7	TP1	J-1	TP202	H-6
Q209	H-6	Q235	K-7	RV201	L-5	TP2	H-4	TP203	I-5
Q212	H-6	Q236	K-6	RV202	H-6	TP3	J-1	TP204	K-6
Q213	H-6	Q237	K-7	RV203	K-6	TP4	G-5	TP205	I-7
Q219	L-6	Q238	K-7	RV204	I-7	TP5	I-4	TP206	J-6
Q220	L-6	Q239	H-7	RV205	I-6	TP6	K-2	TP207	K-7
Q221	L-6			RV206	K-6	TP7	K-3		
Q222	K-6	RV1	K-3	RV207	K-7	TP8	K-3		
Q223	K-6	RV2	L-3	RV208	K-7	TP9	K-1		
Q224	K-6	RV3	J-5	RV209	K-7	TP10	L-4		
Q225	J-7	RV4	K-5	RV210(N)	H-7	TP11	K-4		

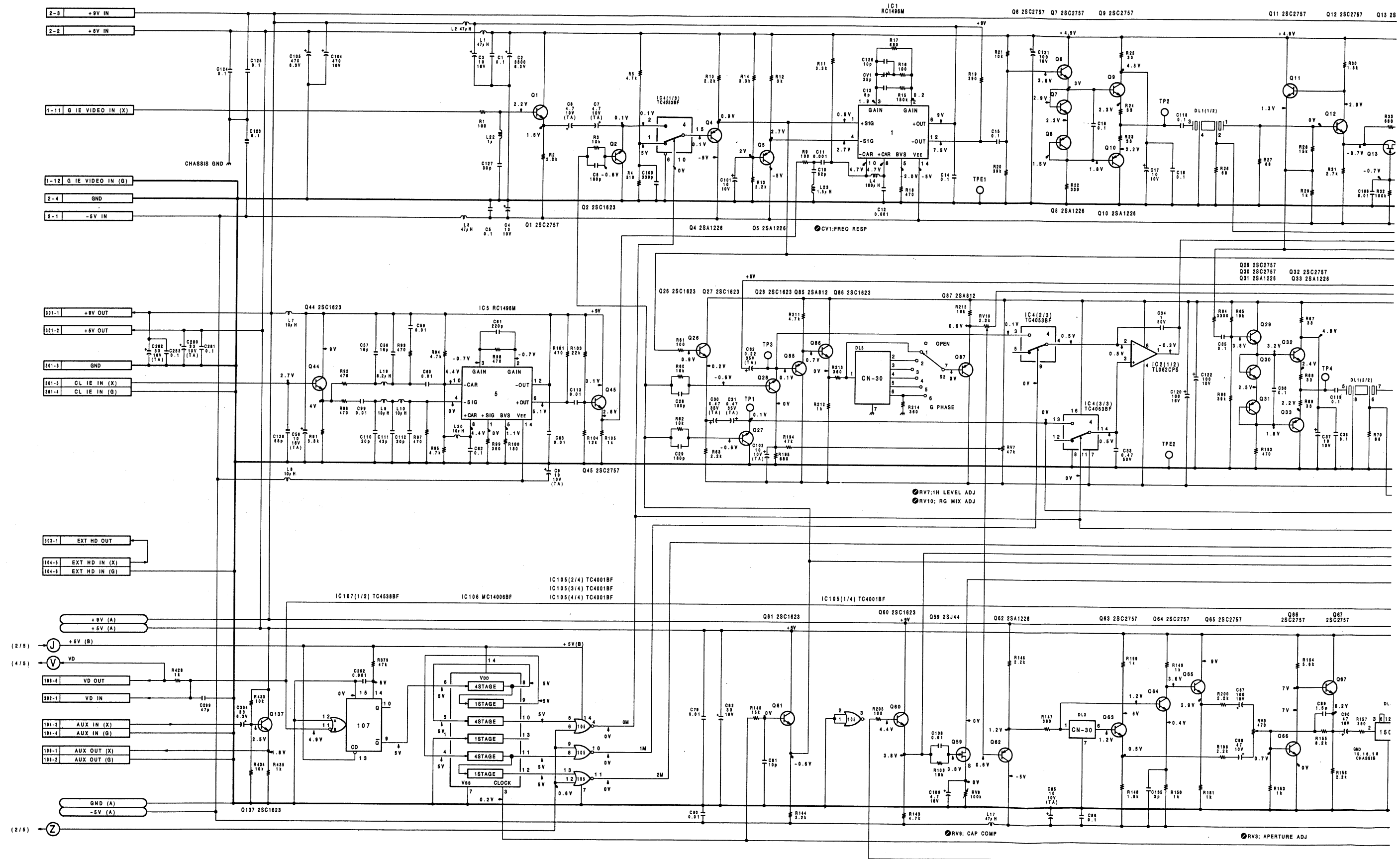


SG-198 BOARD

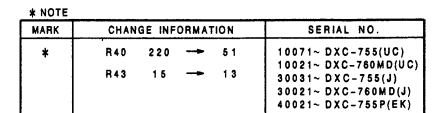
—COMPONENT SIDE—
1-639-427-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198(1/5)BOARD

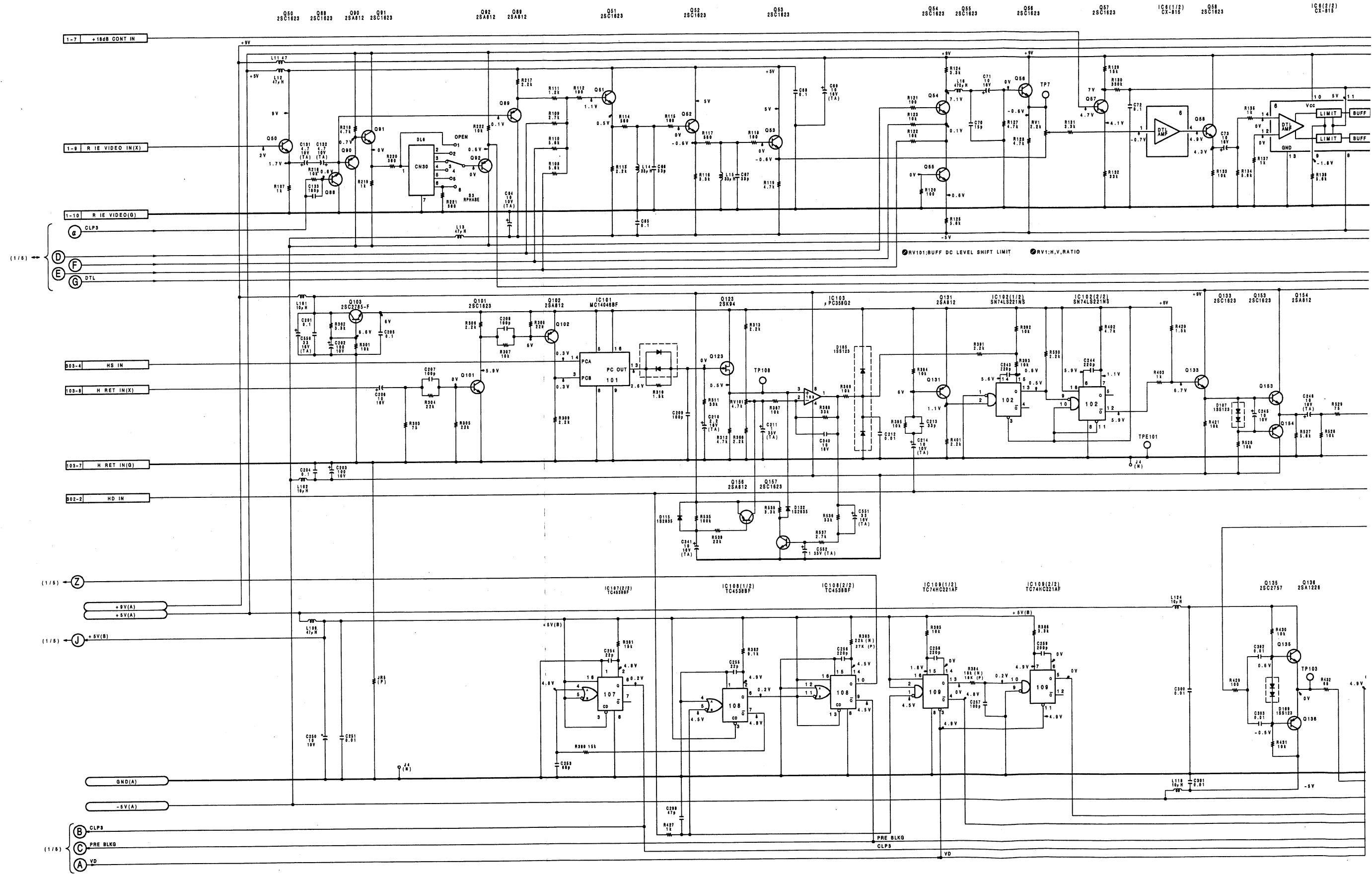


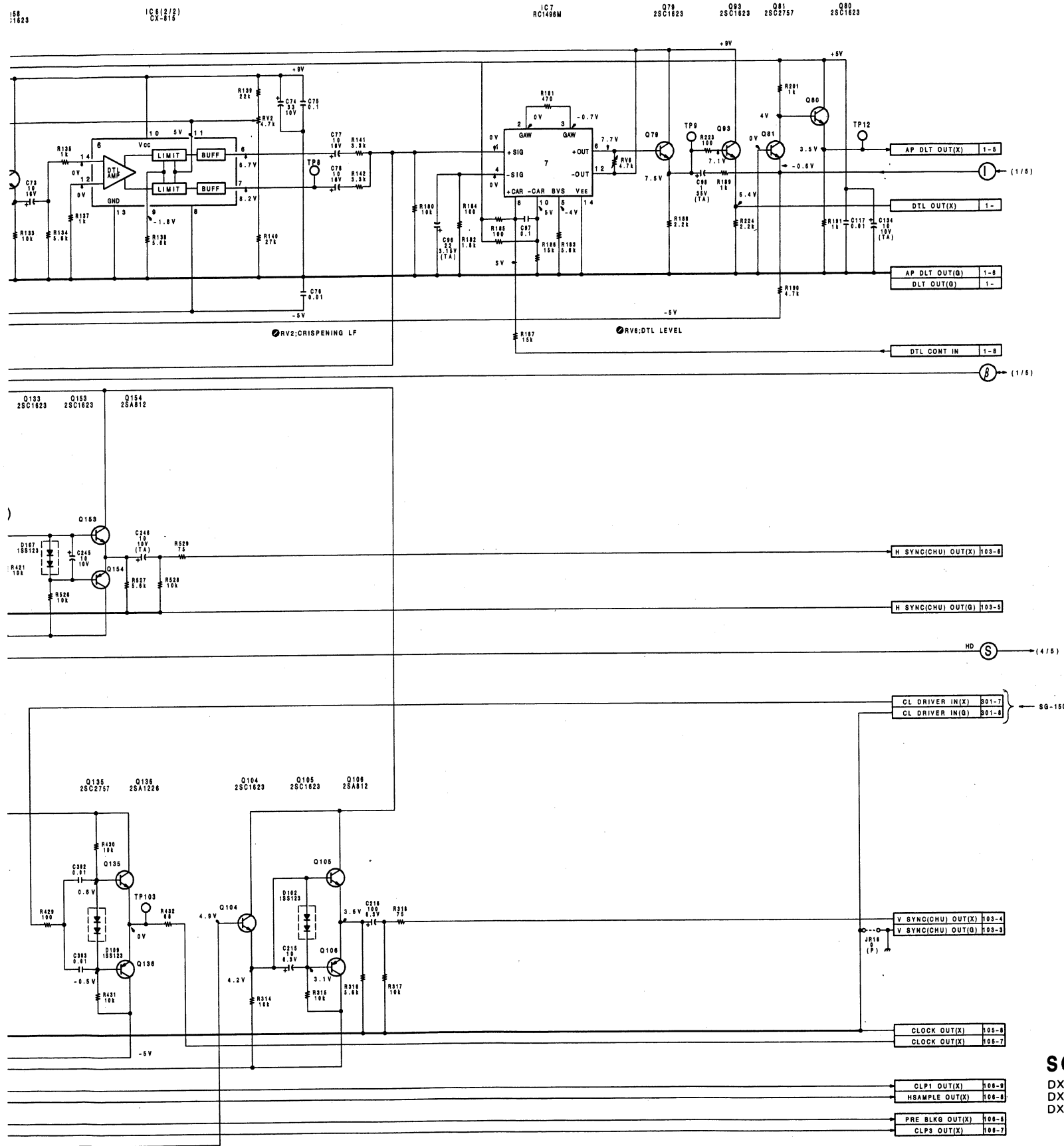
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198(2/5)BOARD

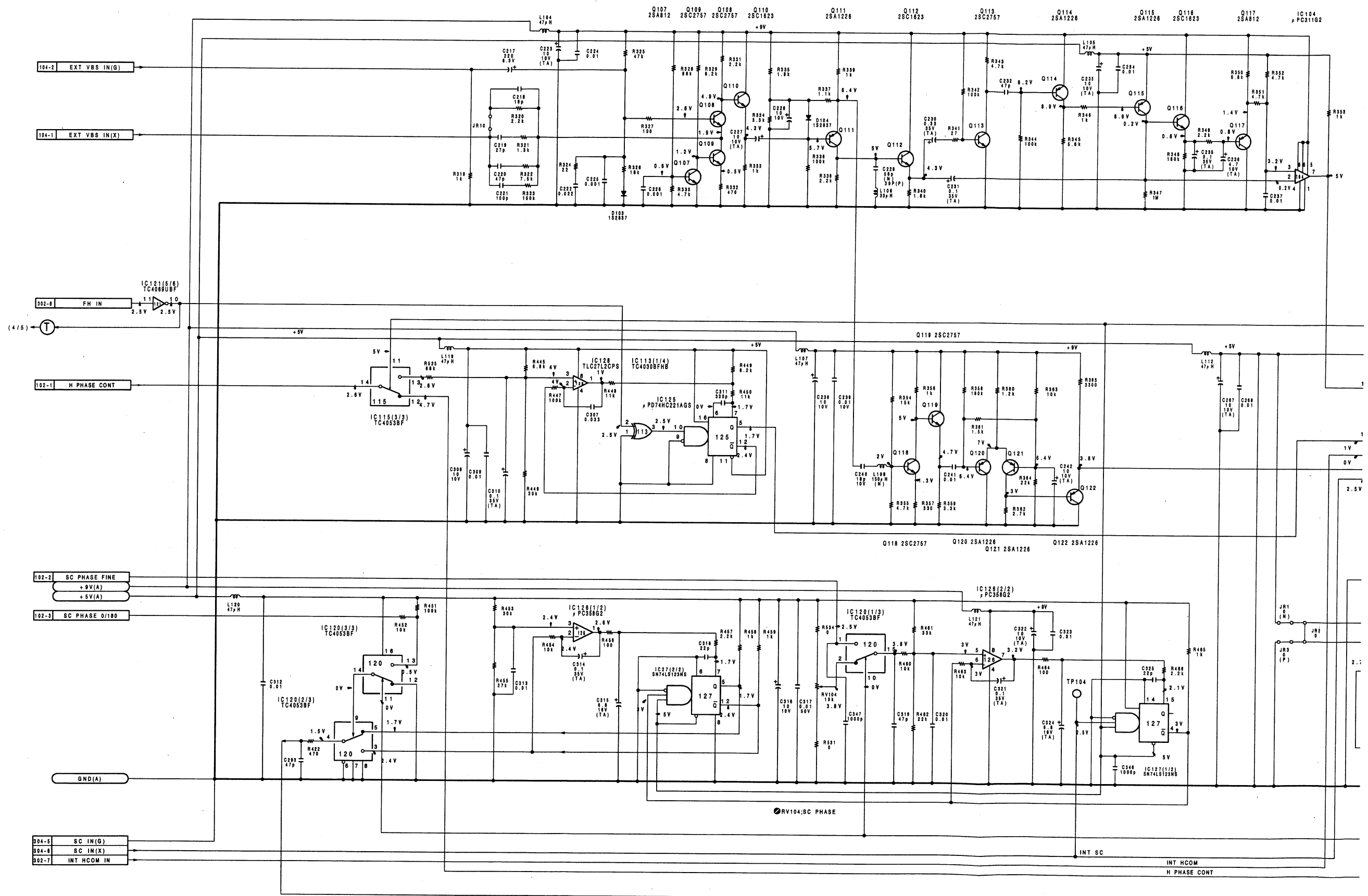




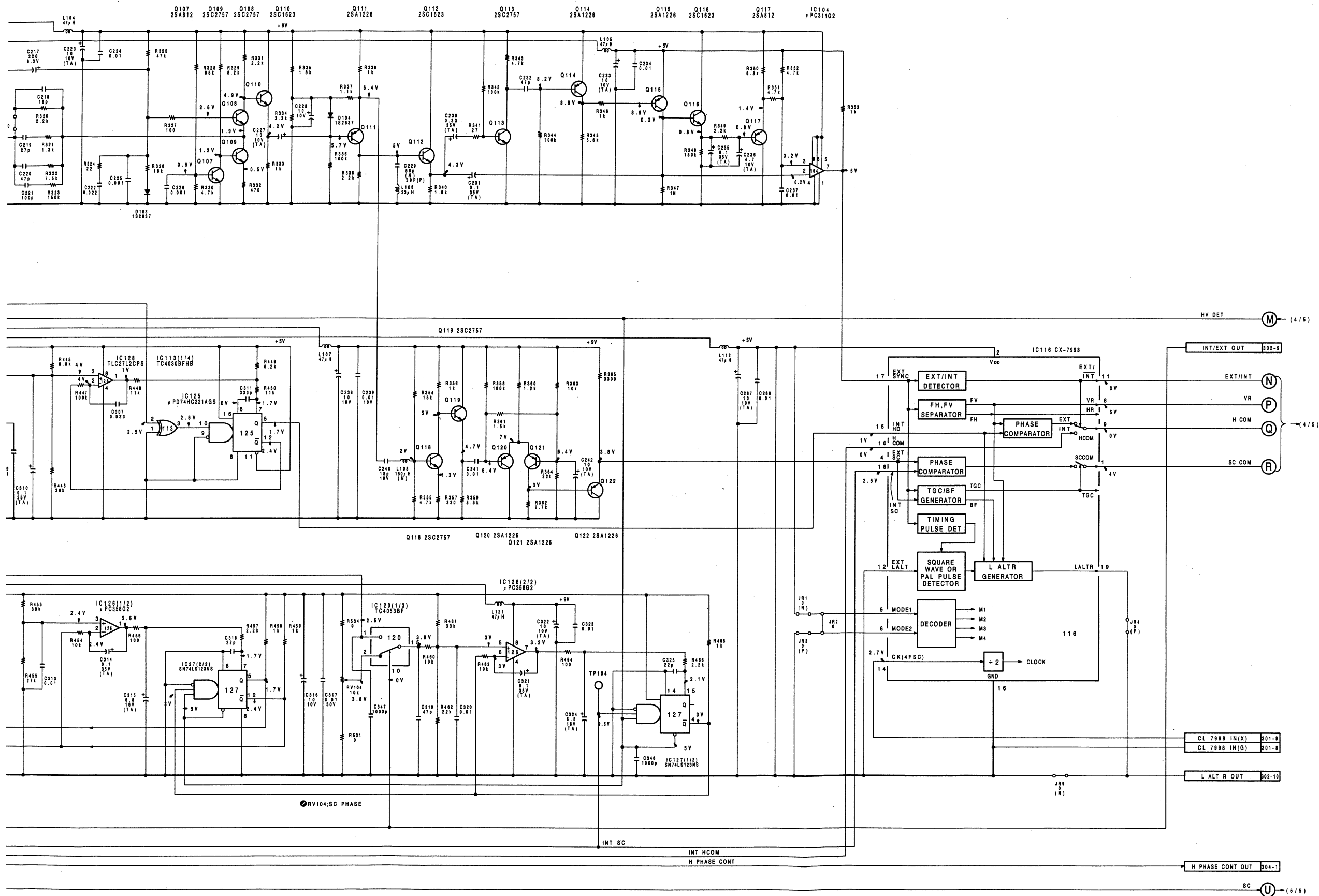
SG-198 (2 / 5) BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198(3/5)BOARD

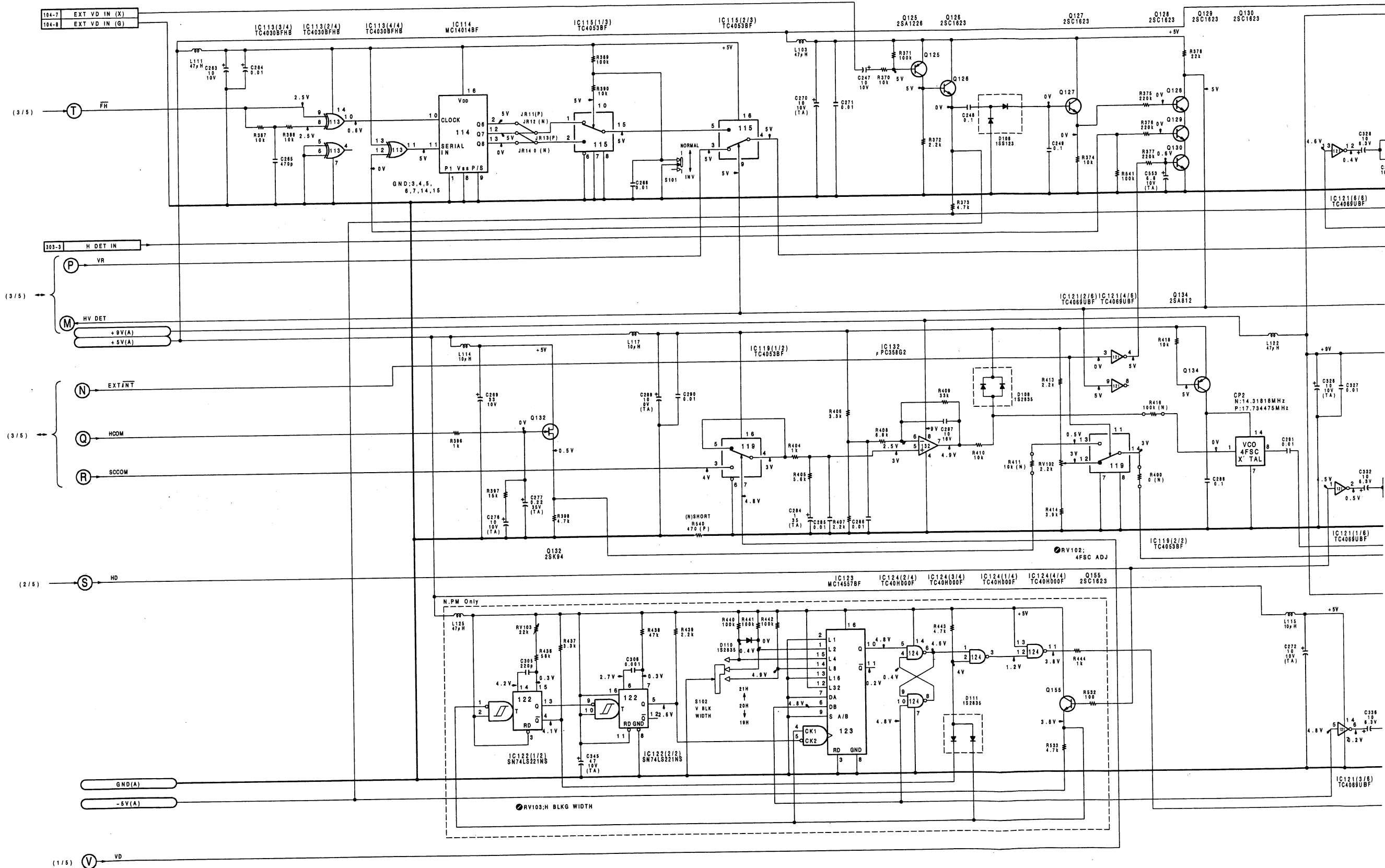
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

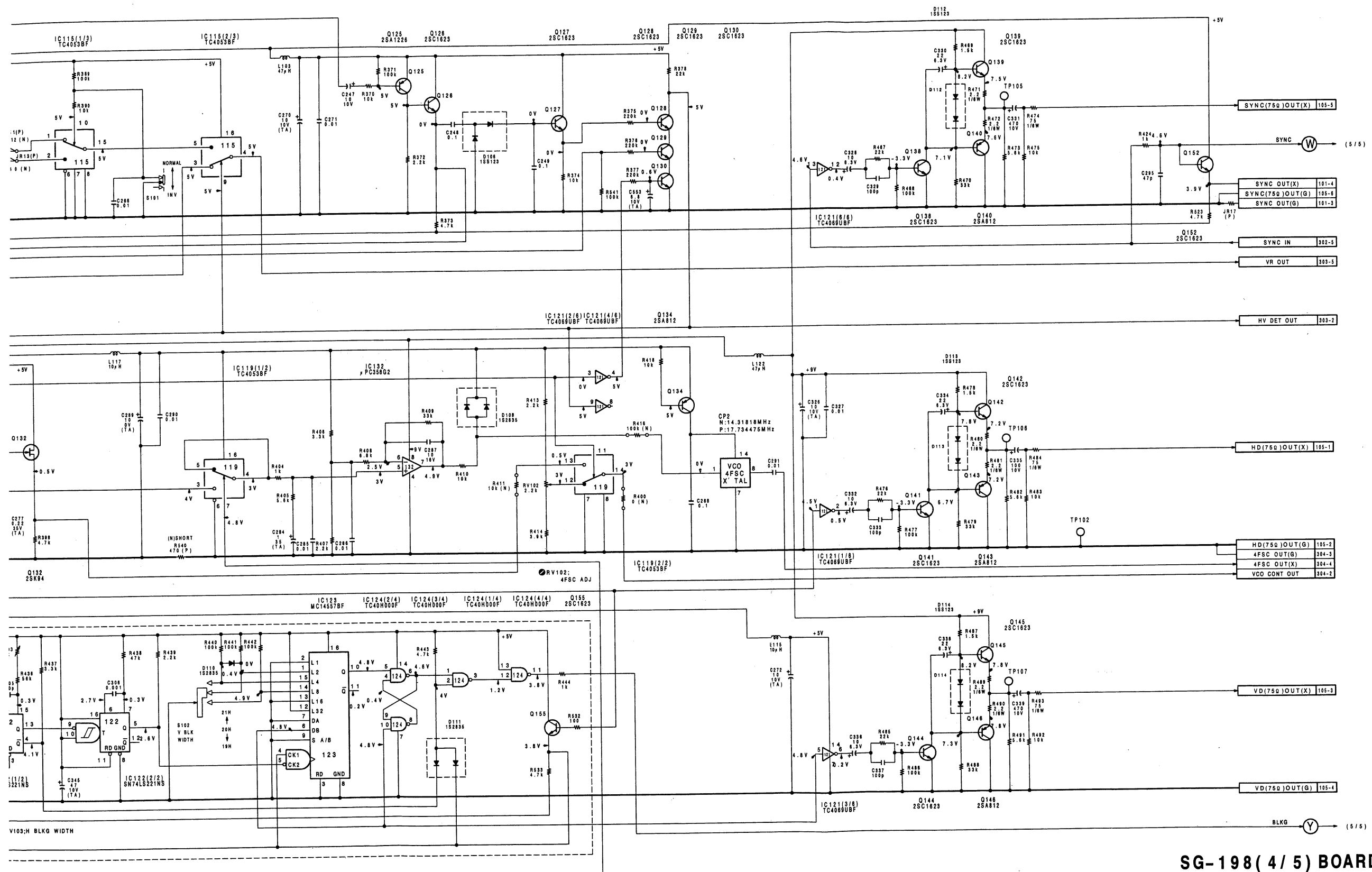


SG-198(3/5) BOARD

DXC-755 (UC, J)
 DXC-755P (EK)
 DXC-760MD (UC, J)

SG-198(4/5)BOARD



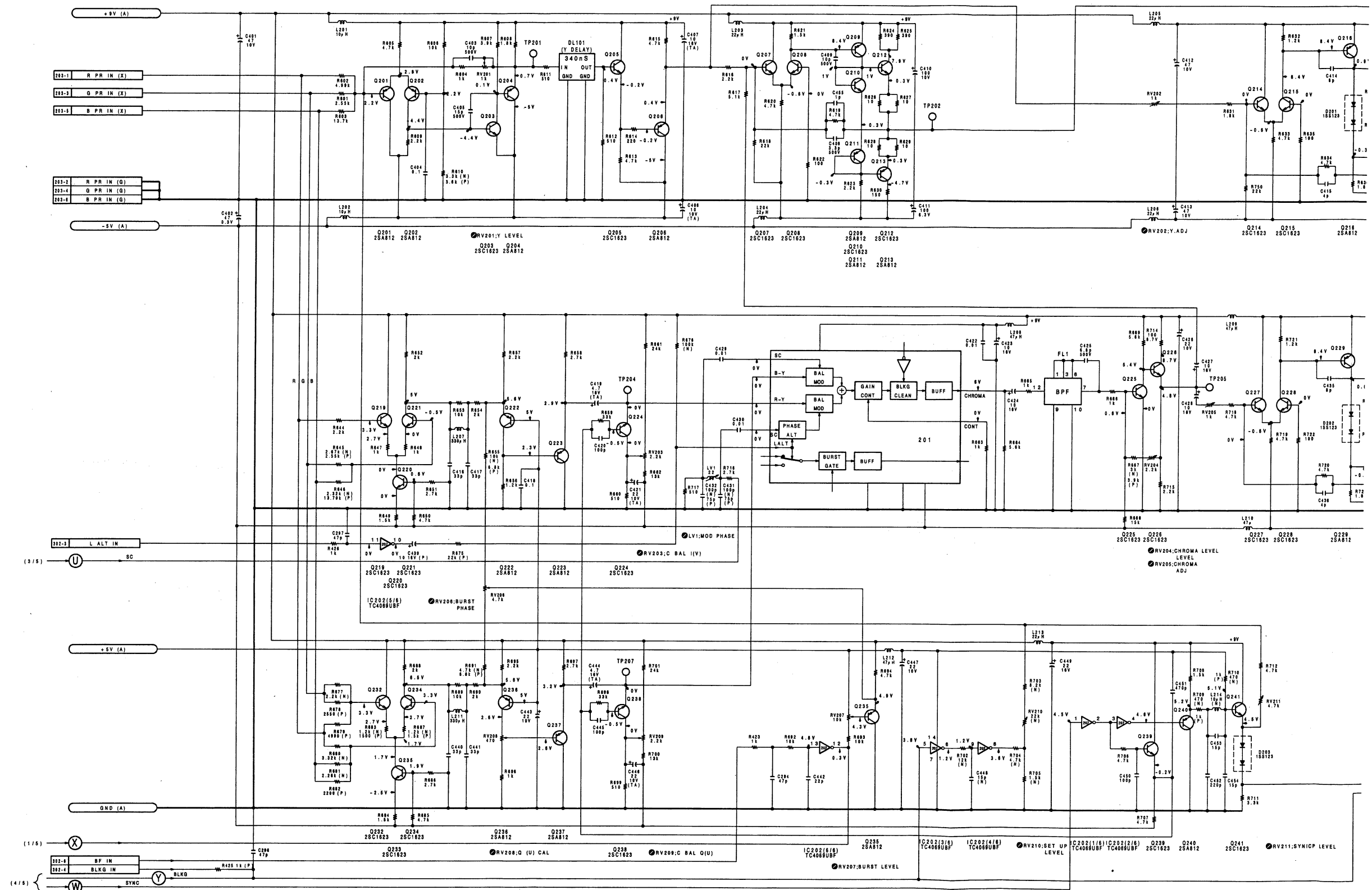


SG-198(4/5) BOARD

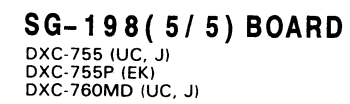
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SG-198(5/5)BOARD



DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



SG-150 BC

COMP

CN1
CN2
CN3
CN4

CV2

D3

E1

IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10

L1
L2
L3
L4
L5
L6

Q3

TP1
TP2
TP3
TP4
TP5

X1

SOLDI

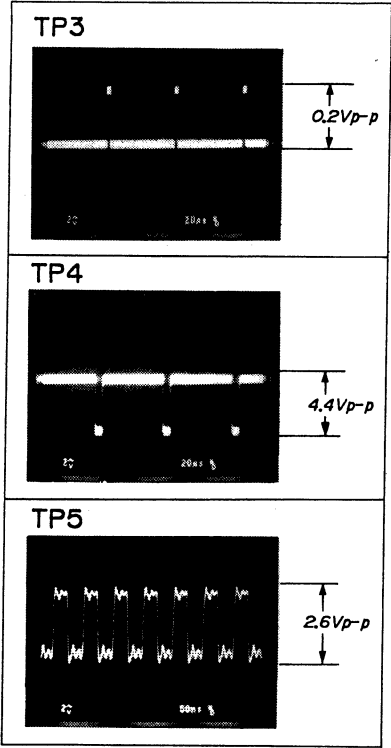
CN1
CN2
CN3
CN4

D1

FB1
FB2
FB3

JR1
JR2
JR3
JR4
JR5

Q1
Q2
Q4
Q5
Q6
Q7
Q9



注意：

1. DC電圧はデジタル電圧計(入力インピーダンス10MΩ)による値。
2. 波形写真及びDC電圧は下記条件で測定。

・フロントパネル

COLOR TEMP : 3200K
W/B BALANCE AUTO/MAN : AUTO
GAIN : 0dB
MASTER PED : 中央位置
IRIS AUTO/MAN : AUTO
GAIN : 0dB
SHUTTER ON/OFF : OFF
MODE : CAM
DETAIL : 中央位置
PHASE SC 0/180 : 0

・リアパネル

GAMMA : ON
LINEAR MATRIX : ON

・カラーバーを撮影

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

NOTE :

1. All voltage are dc, measured with a digital voltmeter. (input impedance : 10MΩ)
2. All waveforms are taken and DC voltage is measured in condition below.

・FRONT PANEL

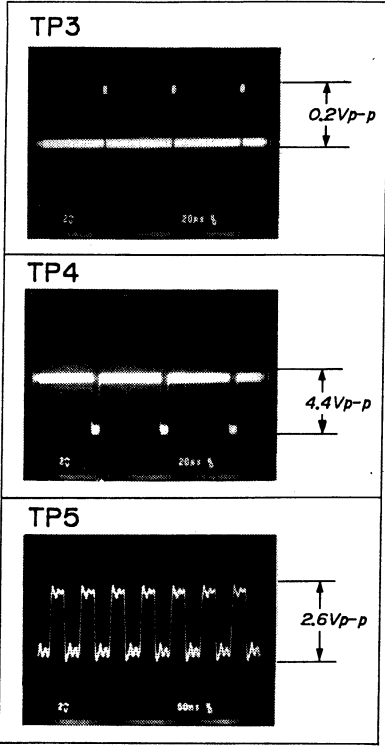
COLOR TEMP : 3200K
W/B BALANCE AUTO/MAN : AUTO
GAIN : 0dB
MASTER PED : mechanical center
IRIS AUTO/MAN : AUTO
GAIN : 0dB
SHUTTER ON/OFF : OFF
MODE : CAM
DETAIL : mechanical center
PHASE SC 0/180 : 0

・REAR PANEL

GAMMA : ON
LINEAR MATRIX : ON

・Shoot the color bar chart

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------



注意：

- DC電圧はデジタル電圧計(入力インピーダンス10MΩ)による値。
- 波形写真及びDC電圧は下記条件で測定。

・フロントパネル

COLOR TEMP : 3200K
W/B BALANCE AUTO/MAN : AUTO
GAIN : 0dB
MASTER PED : 中央位置
IRIS AUTO/MAN : AUTO
GAIN : 0dB
SHUTTER ON/OFF : OFF
MODE : CAM
DETAIL : 中央位置
PHASE SC 0/180 : 0

・リアパネル

GAMMA : ON
LINEAR MATRIX : ON

・カラーバーを撮影

YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------

SG-150 BOARD

COMPONENT SIDE(-13)

CN1 K-2
CN2 K-6
CN3 B-2
CN4 E-7

CV2 G-3

D3 F-3

E1 H-2

IC1 D-5
IC2 C-5
IC3 G-5
IC4 C-3
IC5 D-3
IC6 J-5
IC7 H-3
IC8 J-3
IC9 E-5
IC10 J-4

L1 D-1
L2 B-5
L3 G-4
L4 H-1
L5 G-3
L6 C-4

Q3 J-2

TP1 E-3
TP2 F-5
TP3 B-3
TP4 K-4
TP5 J-2

X1 E-2

SOLDERING SIDE(-13)

CN1 K-2
CN2 K-6
CN3 B-1
CN4 E-7

D1 E-5

FB1 J-3
FB2 J-4
FB3 J-2

JR1 J-5
JR2 J-6
JR3 H-6
JR4 J-7
JR5 J-3

Q1 E-5
Q2 E-4
Q4 B-2
Q5 F-2
Q6 F-2
Q7 F-4
Q9 G-5

NOTE：

- All voltage are dc, measured with a digital voltmeter. (input impedance : 10MΩ)
- All waveforms are taken and DC voltage is measured in condition below.

・FRONT PANEL

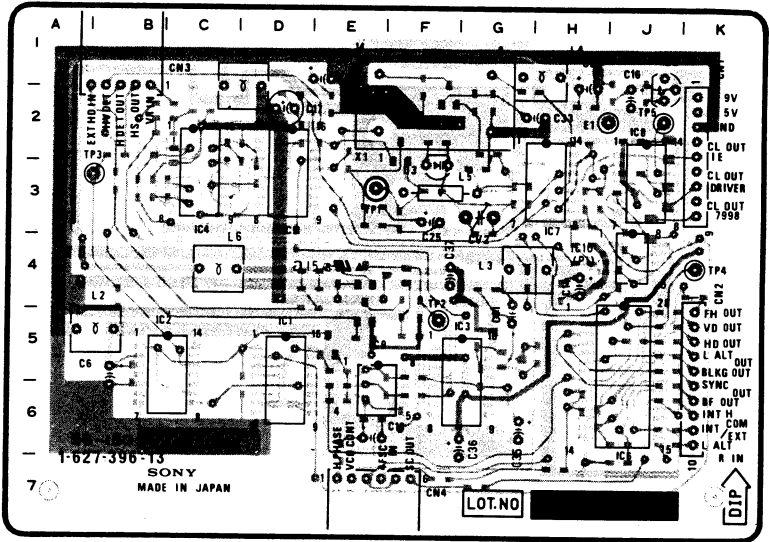
COLOR TEMP : 3200K
W/B BALANCE AUTO/MAN : AUTO
GAIN : 0dB
MASTER PED : mechanical center
IRIS AUTO/MAN : AUTO
GAIN : 0dB
SHUTTER ON/OFF : OFF
MODE : CAM
DETAIL : mechanical center
PHASE SC 0/180 : 0

・REAR PANEL

GAMMA : ON
LINEAR MATRIX : ON

・Shoot the color bar chart

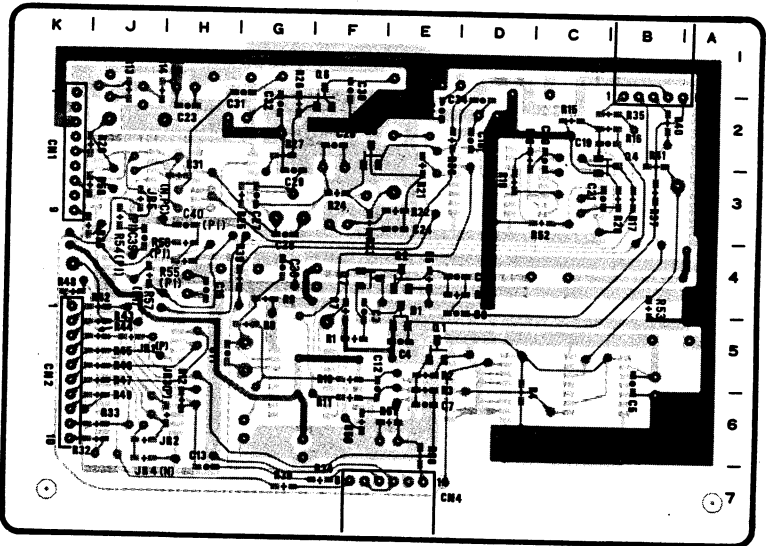
YEL	CYAN	GRN	WHT	MAG	RED	BLUE
-----	------	-----	-----	-----	-----	------



SG-150 BOARD

—COMPONENT SIDE—

1-627-396-13
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



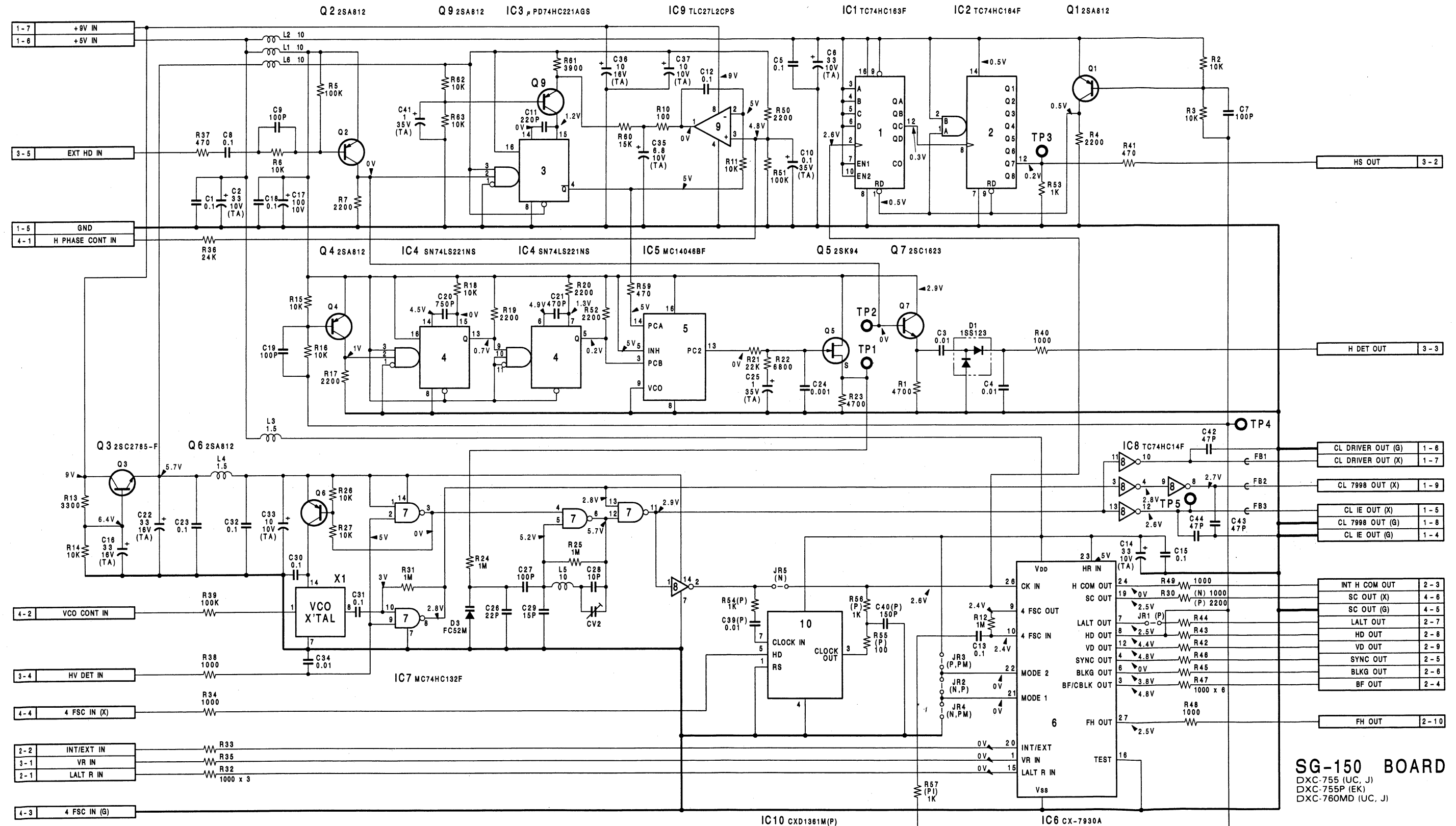
SG-150 BOARD

—SOLDERING SIDE—

1-627-396-13
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

(N) : NTSC
(P) : PAL

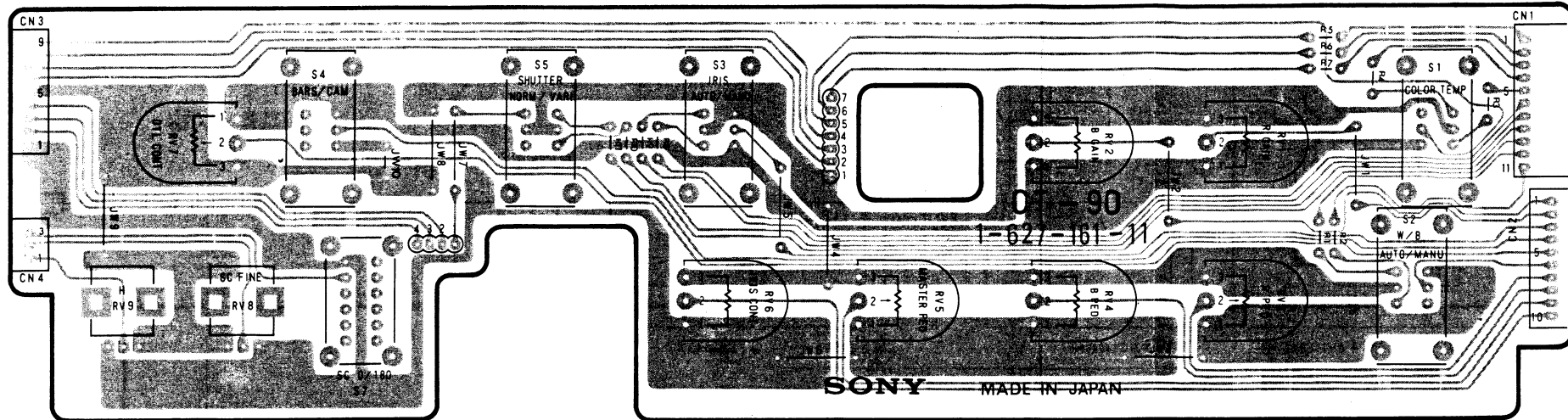
SG-150 BOARD



SG-150 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

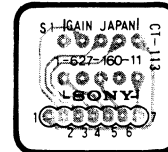
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

CT-90, 91, 113 BOARDS

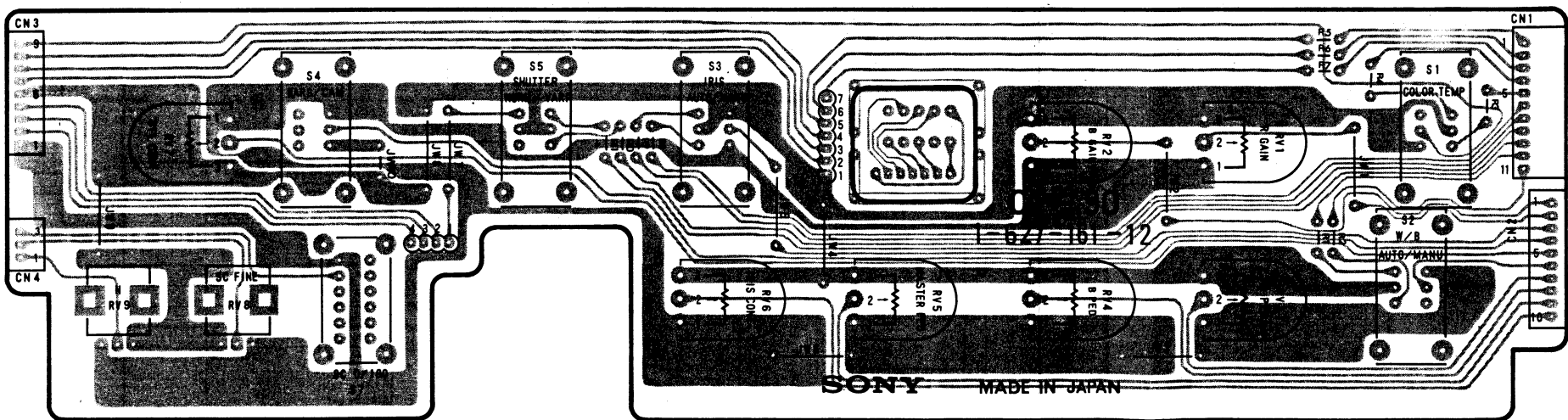


CT-90 BOARD

—SOLDERING SIDE—
1-627-161-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

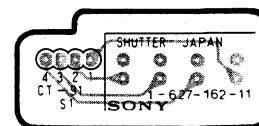
**CT-113** BOARD

—SOLDERING SIDE—
1-627-160-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

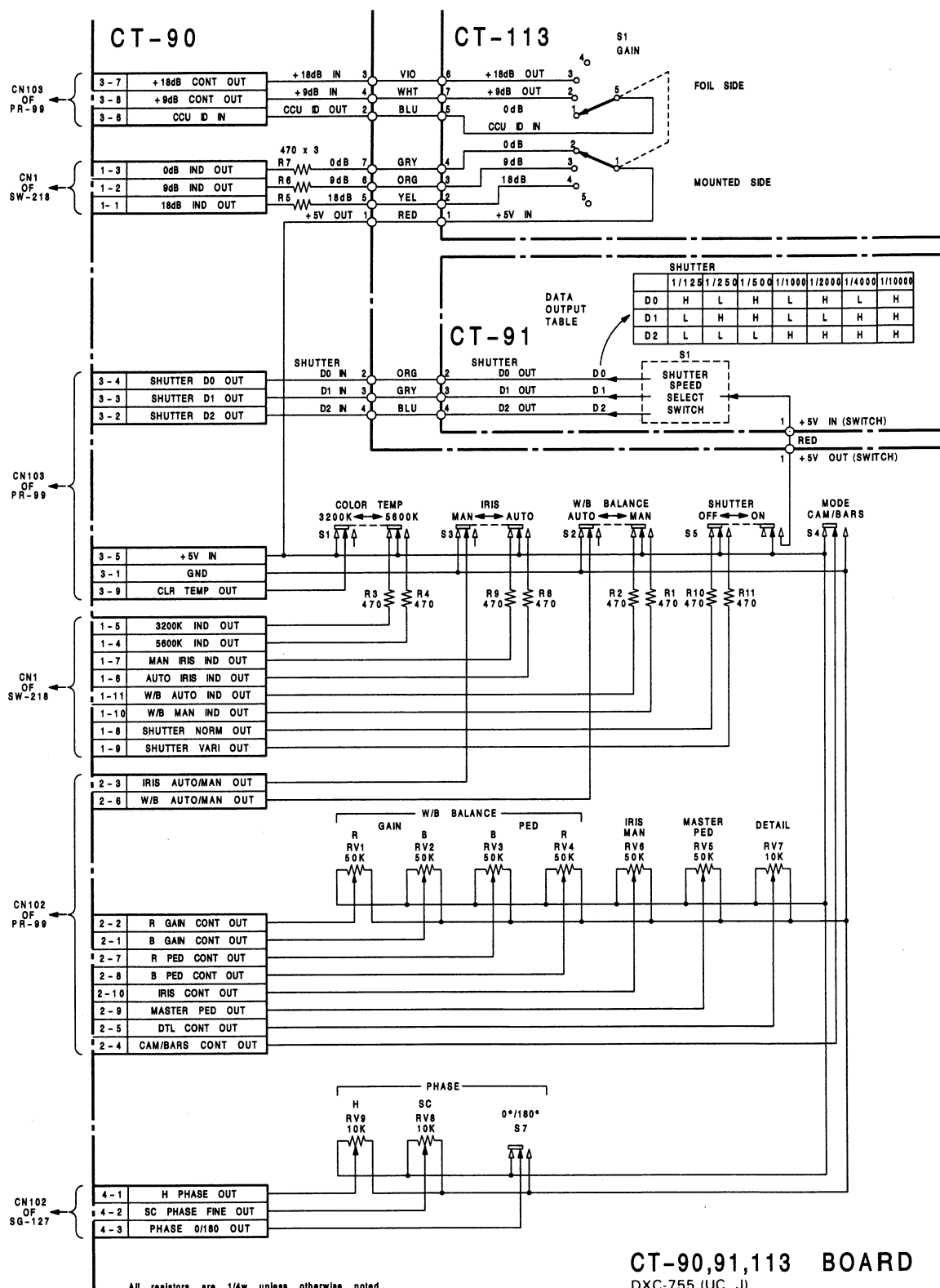


CT-90 BOARD

—SOLDERING SIDE—
1-627-161-12
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

**CT-91** BOARD

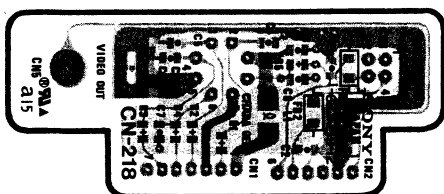
—SOLDERING SIDE—
1-627-162-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



CT-90,91,113 BOARD
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

CN-218, SW-218

CN-218 BOARD



CN-218 BOARD

—SOLDERING SIDE—

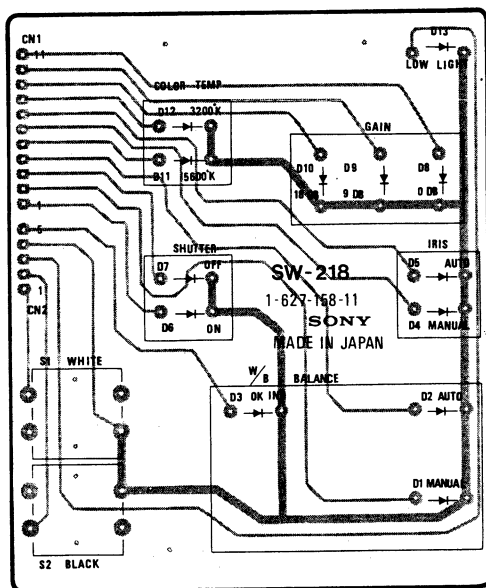
1-627-159-12

DXC-755 (UC, J)

DXC-755P (EK)

DXC-760MD (UC, J)

SW-218 BOARD



SW-218 BOARD

—SOLDERING SIDE—

1-627-158-11

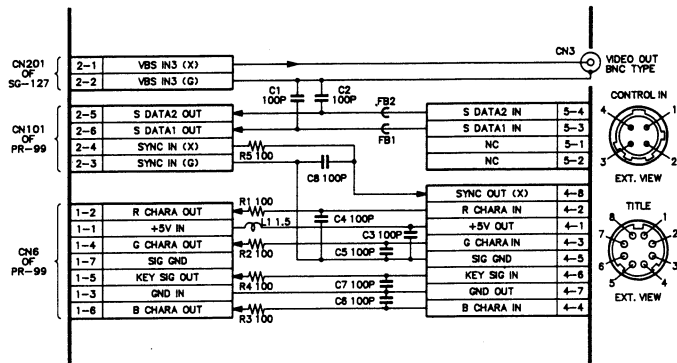
DXC-755 (UC, J)

DXC-755P (EK)

DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

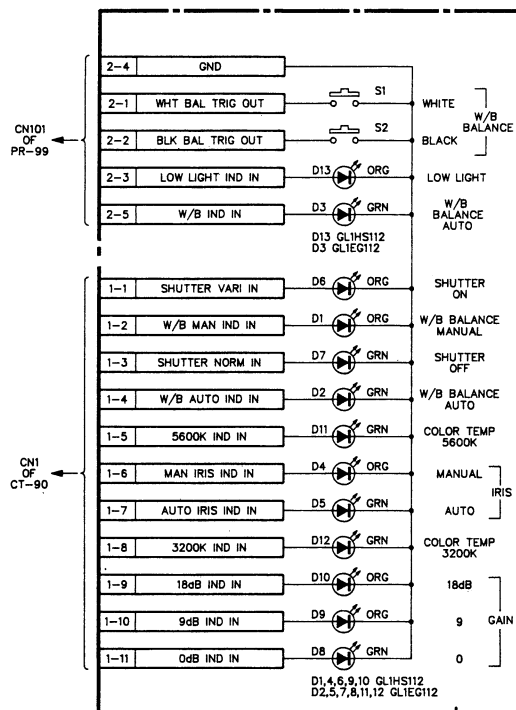
CN-218 BOARD



CN-218 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

SW-218 BOARD

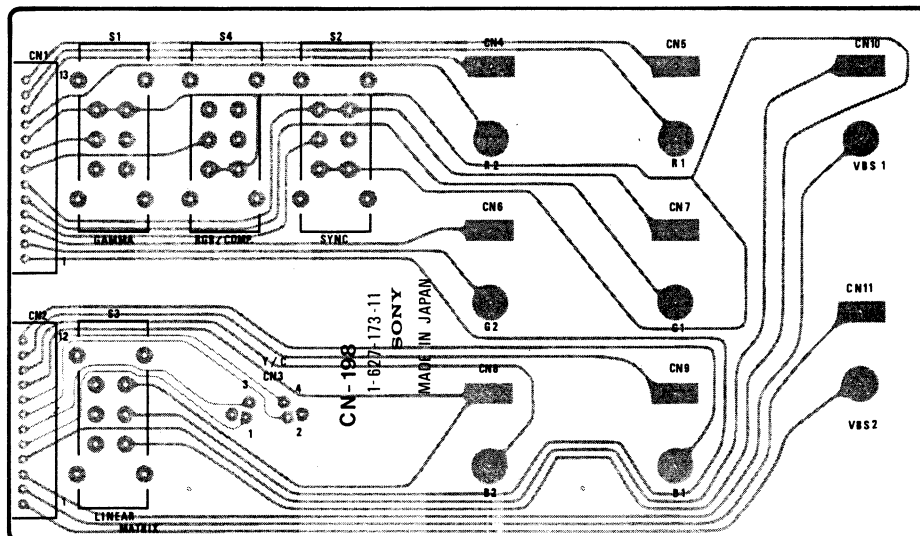


SW-218 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

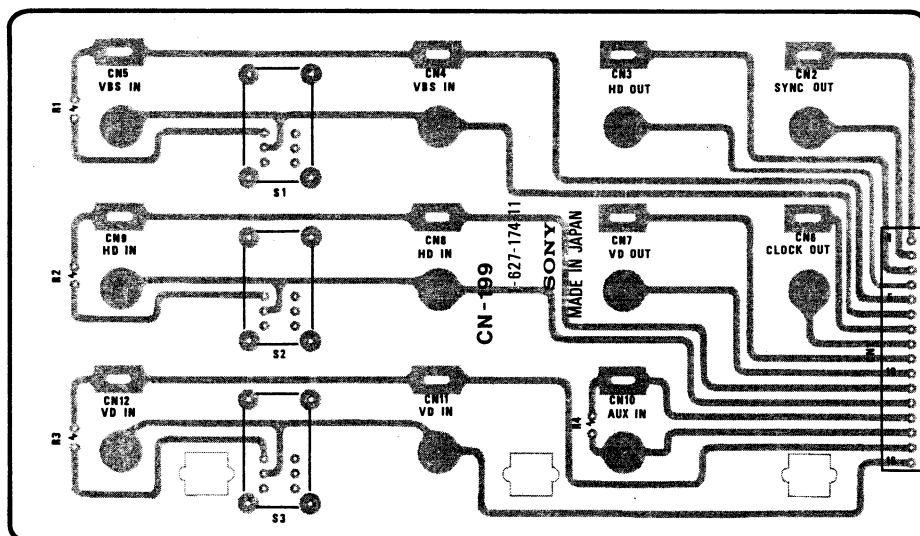
CN-198, 199 BOARDS



CN-198 BOARD

—SOLDERING SIDE—

1-627-173-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



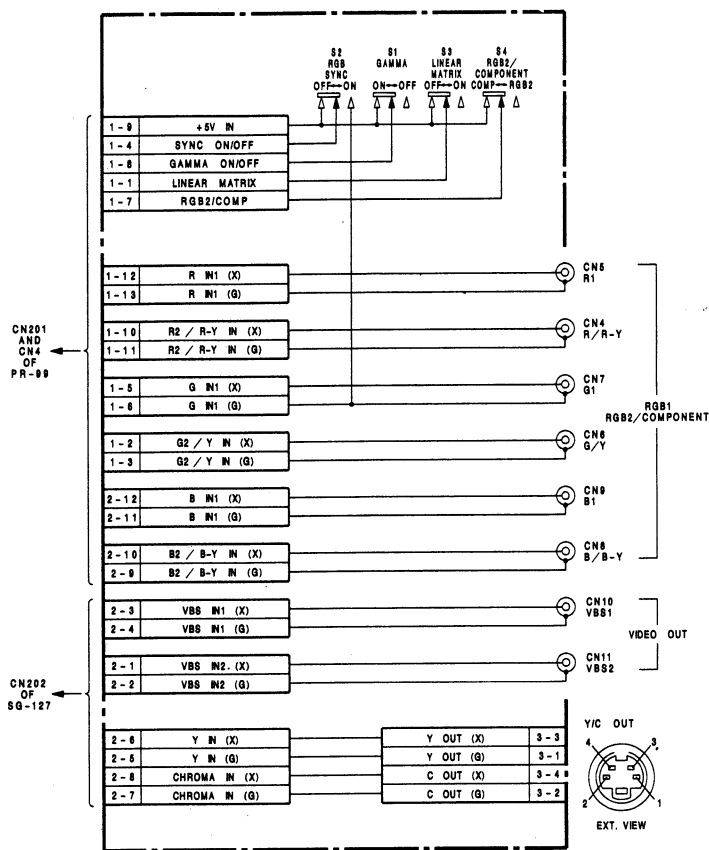
CN-199 BOARD

—SOLDERING SIDE—

1-627-174-11
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

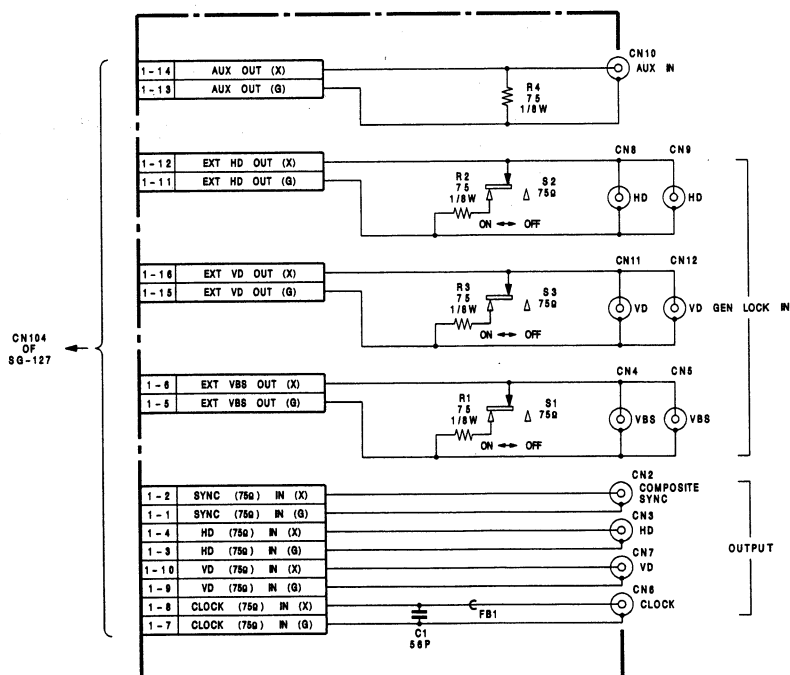
DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

CN-198, 199 BOARDS



CN-198 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)



CN-199 BOARD

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

DXC-755 (UC, J)
DXC-755P (EK)
DXC-760MD (UC, J)

第 6 章

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CHAPTER 6

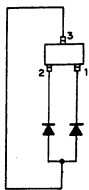
SEMICONDUCTOR PIN ASSIGNMENTS

The circuit diagram of IC is obtained from the IC data book published by the manufacturer.

TYPE	PAGE	TYPE	PAGE	TYPE	PAGE
1S2835	6-2	MC14006BF	6-15	UPC311G2	6-20
1S2836	6-2	MC14014BF	6-15	UPC358G2	6-20
1S2837	6-2			UPD74HC221AGS	6-20
1SS123	6-2	MC14046BF	6-16	XN1216	6-2
1SS226	6-2	MC14051BF	6-16	XN1501	6-2
1SS97	6-2	MC14069UBF	6-16	XN4501	6-2
2SA1162	6-2	MC14557BF	6-16	XN4608	6-2
2SA1226	6-2				
2SA1462	6-2	MC74HC00AF	6-16		
2SA812	6-2	MC74HC04F	6-16		
2SC1623	6-2	MC74HC132F	6-17		
2SC2757	6-2	MC74HC4053F	6-17		
2SC2785	6-2	MC74HC574F	6-17		
2SJ44	6-2	MN1237A	6-17		
2SK94	6-2	NTM2369	6-2		
3SK163	6-2	OP-07DPS	6-18		
CX22017	6-3	RC1496M	6-18		
CX7930A	6-3	RD ? ? M	6-2		
CX7998	6-5	S-8054ALR-LN	6-18		
CX815	6-5				
CXA1065M	6-5	SN74HC14NS	6-18		
CXB0026AM	6-5	SN74HC163NS	6-18		
CXD1035BQ-Z	6-6	SN74HC164NS	6-18		
CXD1084Q-W	6-12	SN74HC574NS	6-17		
CXD1141M	6-13	SN74LS123NS	6-19		
CXD1216M	6-5	SN74LS221NS	6-19		
CXD1361M	6-14				
FC52M	6-2	TC4001BF	6-19		
GL-1EG112	6-2	TC4030BFHB	6-19		
GL-1HS112	6-2	TC4051BF	6-16		
HD44860B42	6-14	TC4053BFHB	6-19		
HZ ? ? ALL	6-2	TC4069UBF	6-16		
LM2903M	6-15	TC40H000F	6-19		
LM35DZ	6-15	TC40H008F	6-19		
MA121	6-2	TC4538BF	6-20		
MA152WK	6-2	TC4S11F	6-20		
MB7114LPF	6-15	TC4S69F	6-20		
		TC74HC00F	6-16		
		TC74HC04F	6-16		
		TC74HC14F	6-18		
		TC74HC163F	6-18		
		TC74HC164F	6-18		
		TC74HC221AF	6-20		
		TL062CPS	6-20		
		TL064CNS	6-20		
		TL072CPS	6-20		
		TL082CPS	6-20		
		TLC27L2CPS	6-20		

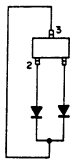
DIODE, TRANSISTOR

(SCALE 4/1)
TOP VIEW



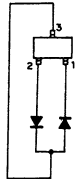
1S2835
1S2836

(SCALE 4/1)
TOP VIEW

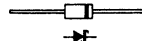


1S2837
MA152WK

(SCALE 4/1)
TOP VIEW



1SS123
1SS226

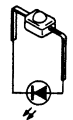


1SS97

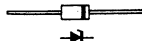


FC52M

(SCALE 2/1)

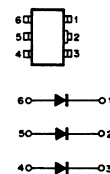


GL-1EG112; YELLOWISH GREEN
GL-1HS112; ORANGE



HZ ? ? ALL

(SCALE 6/1)
TOP VIEW



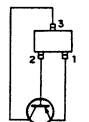
MA121

(SCALE 4/1)
TOP VIEW



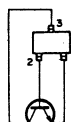
RD ? ? M

(SCALE 4/1)
TOP VIEW



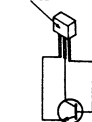
2SA1162
2SA1226
2SA1462
2SA812

(SCALE 4/1)
TOP VIEW



2SC1623
2SC2757
NTM2369

TYPE NO.
PRINTED

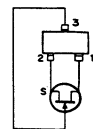


2SC2785



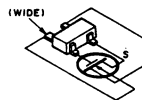
2SJ44

TOP VIEW (SCALE 4/1)



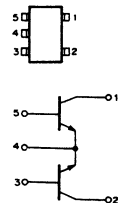
2SK94

(SCALE 3/1)



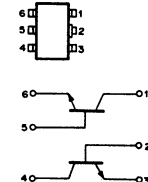
3SK163

(SCALE 6/1)
TOP VIEW



XN1216
XN1501

(SCALE 6/1)
TOP VIEW

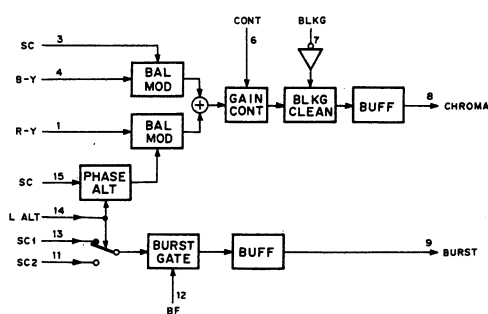
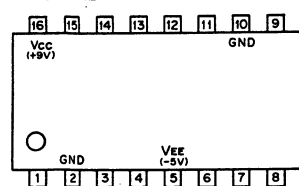


XN4501
XN4608

CX22017 (SONY)

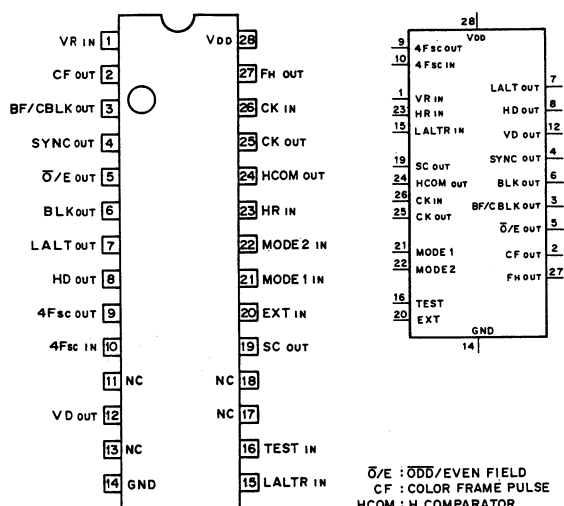
VIDEO SIGNAL PROCESSOR

- TOP VIEW -

CX7930A (SONY) ($V_{DD} = +5V$) FLAT PACKAGE

CMOS SYNC GENERATOR (NTSC, PAL-M, PAL, SECAM)

- TOP VIEW -



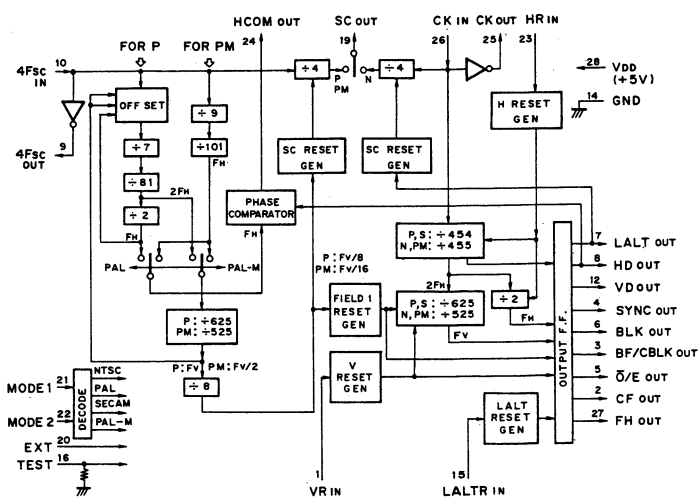
$\bar{O}/E$: $\bar{O}DD$ /EVEN FIELD
CF : COLOR FRAME PULSE
HCOM : H COMPARATOR

SYSTEM	4Fsc	CLOCK
NTSC	910 Fh	910 Fh
PAL	1135 Fh + 2Fv	908 Fh
PALM	909 Fh	910 Fh
SECAM		908 Fh

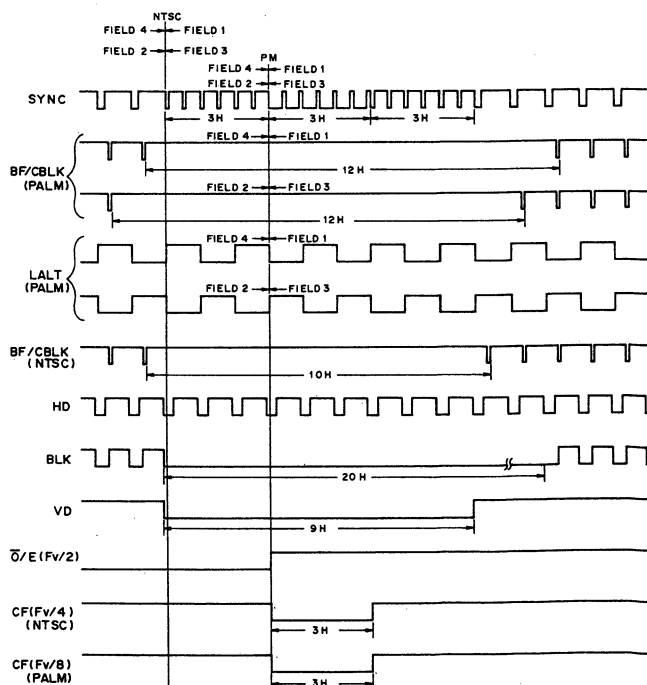
INPUTS	MODE1	MODE2	SYSTEM
MODE1	0	0	NTSC
MODE2	0	1	SECAM
MODE1	1	0	PALM
MODE2	1	1	PAL

INPUTS	EXT	TEST	FUNCTION
EXT	0	0	INTERNAL
TEST	0	1	INVALID
EXT	1	0	EXT
TEST	1	1	TEST

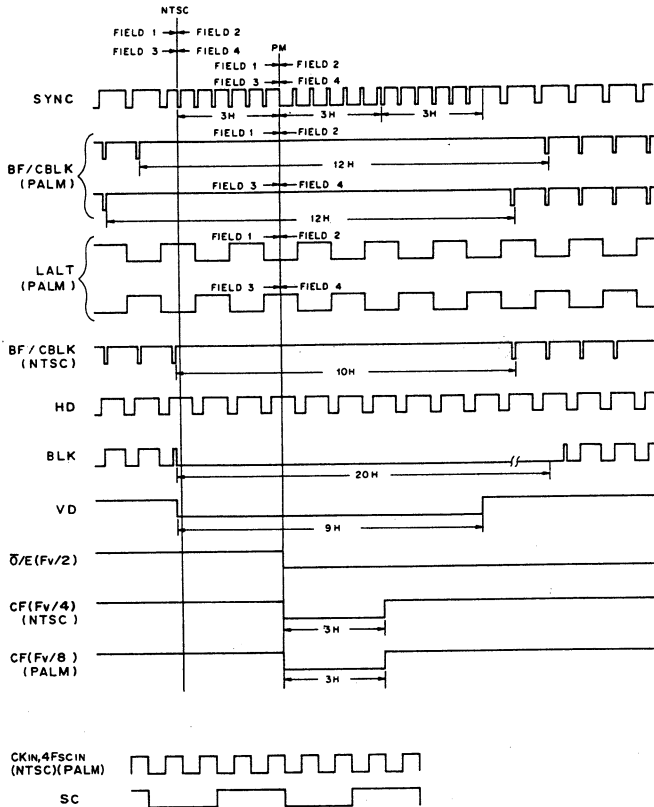
0 : LOW LEVEL (GND)
1 : HIGH LEVEL (VDD)
TEST "0": OPEN (INTERNALLY PULLED DOWN)



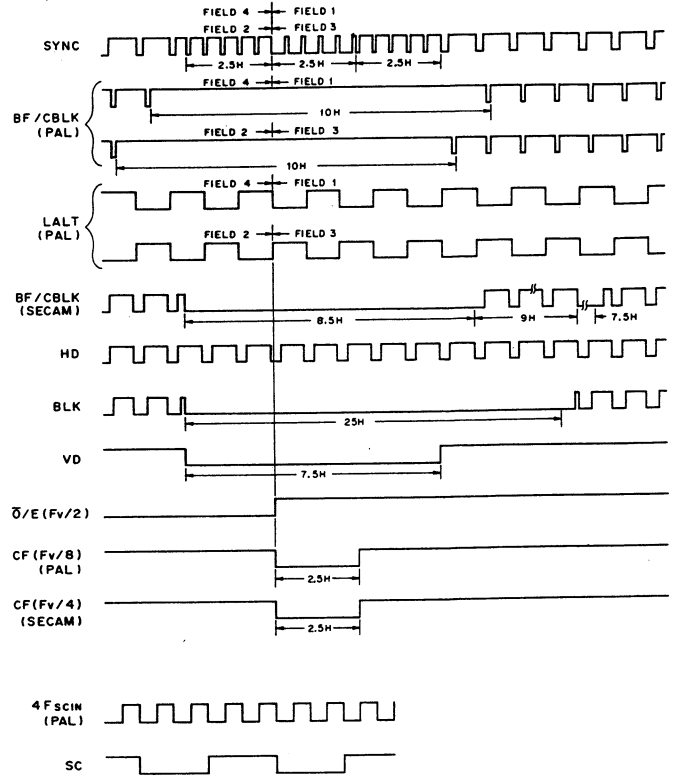
NTSC, PAL-M (FIELD 1, 3)



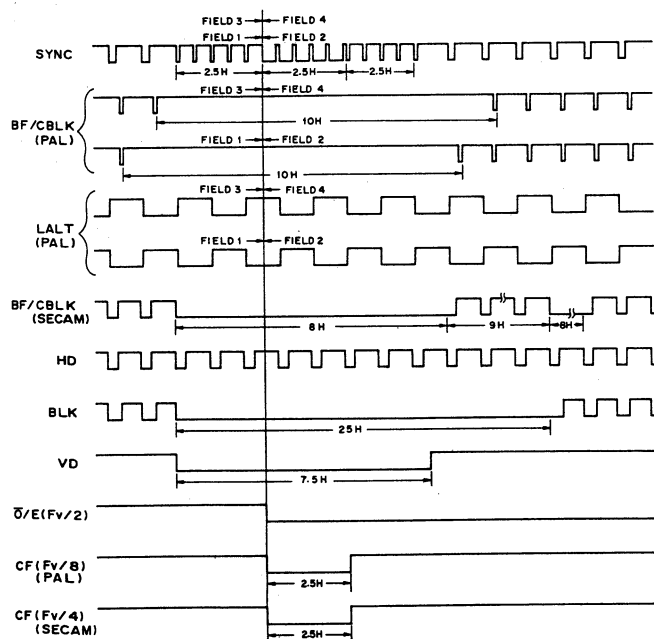
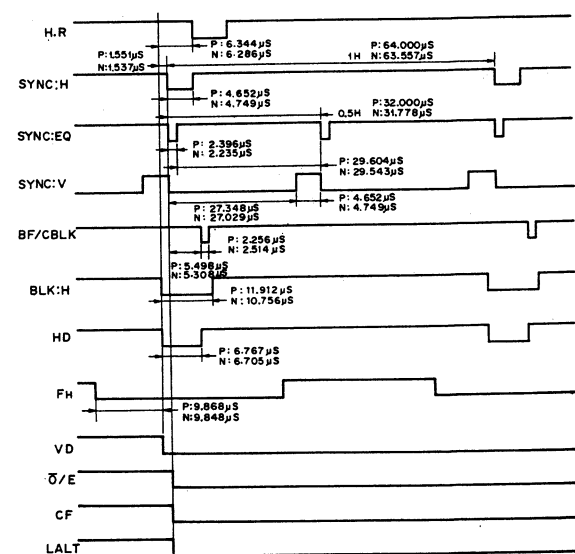
NTSC, PAL-M (FIELD 2, 4)



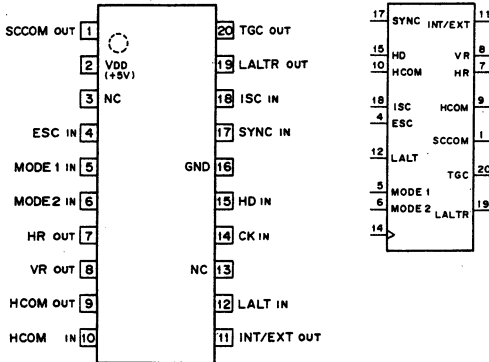
PAL, SECAM (FIELD 1, 3)



PAL, SECAM (FIELD 4, 2)

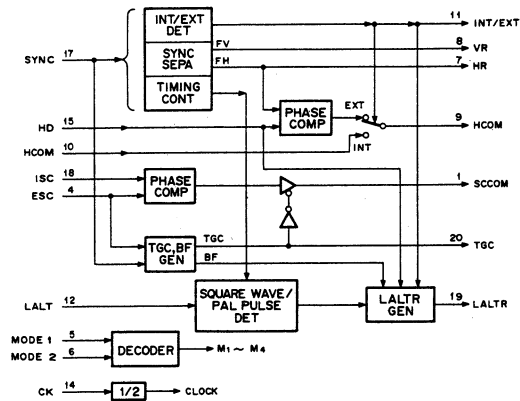
P: PAL, SECAM
N: NTSC, PALM

CX7998 (SONY) FLAT PACKAGE
CXD1216M (SONY) FLAT PACKAGE
C-MOS GENLOCK DRIVER
- TOP VIEW -



INPUT		MODE	SYSTEM
MODE1	MODE2		
0	0	M1	PAL-VBS
1	0	M2	PALM-VBS
0	1	M3	PALSECAM-VS/SC/LALT
1	1	M4	NTSC-VBS,NTSC-VS/SC PALM-VS/SC/LALT

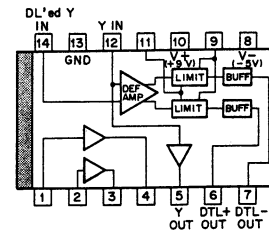
0: LOW LEVEL
1: HIGH LEVEL



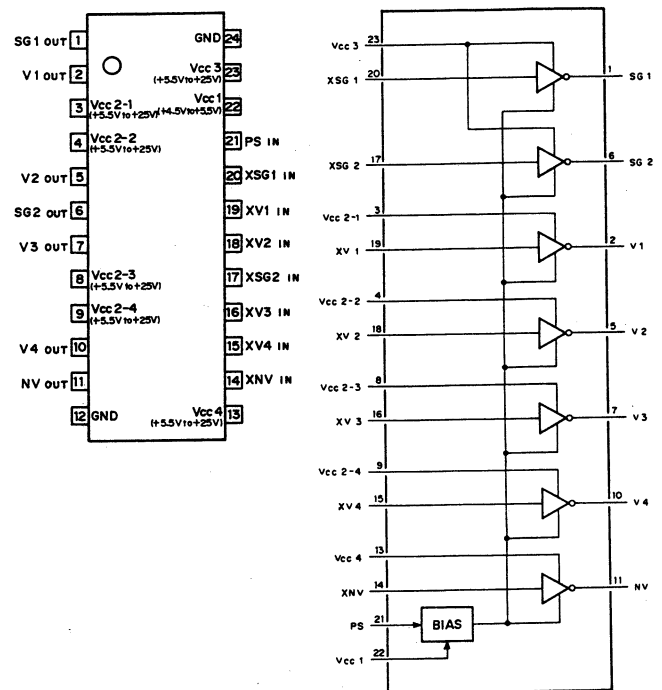
INPUT
CK : 4fsc CLOCK INPUT
ESC : SC/COLOR BURST
HCOM : PHASE COMPARE FROM CXD1217
HD : H DRIVE FROM CXD1217
ISC : SUBCARRIER FROM CXD1217
LALT : LALT FROM REFERENCE SIGNAL GENERATOR
MODE1,2 : SYSTEM SELECT
SYNC : SYNC FROM REFERENCE SIGNAL GENERATOR

OUTPUT
HCOM : PHASE COMPARE HR WITH HD
HR : fh OF SYNC SEPARATE
INT/EXT : INTERNAL/EXTERNAL SPECIFIED
LALTR : LINE CHANGE RESET
SCCOM : PHASE COMPARETOR ESC WITH ISC
TGC : TRISTATE CONTROL
VR : fv OF SYNC SEPARATE

CX815 (SONY)
DTL AMPLIFIER
- TOP VIEW -

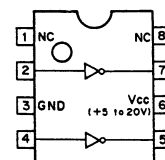


CXA1065M (SONY) FLAT PACKAGE
INVERTING DRIVER FOR CCD CLOCK WITH POWER SAVE
- TOP VIEW -



XV1-XV4: VERTICAL REGISTER TRANSMISSION CLOCK INPUT
V1-V4: VERTICAL REGISTER TRANSMISSION CLOCK OUTPUT
XSG1,XSG2: SENSOR GATE PULSE INPUT
SG1,SG2: SENSOR GATE PULSE OUTPUT
XNV: DRIVER INPUT
NV: DRIVER OUTPUT
PS: POWER SAVE INPUT
Vcc 1: BIAS VOLTAGE
Vcc 2-1: V1 OUTPUT PULSE VOLTAGE
Vcc 2-2: V2 OUTPUT PULSE VOLTAGE
Vcc 2-3: V3 OUTPUT PULSE VOLTAGE
Vcc 2-4: V4 OUTPUT PULSE VOLTAGE
Vcc 3: SG1,SG2 OUTPUT PULSE VOLTAGE
Vcc 4: NV OUTPUT PULSE VOLTAGE

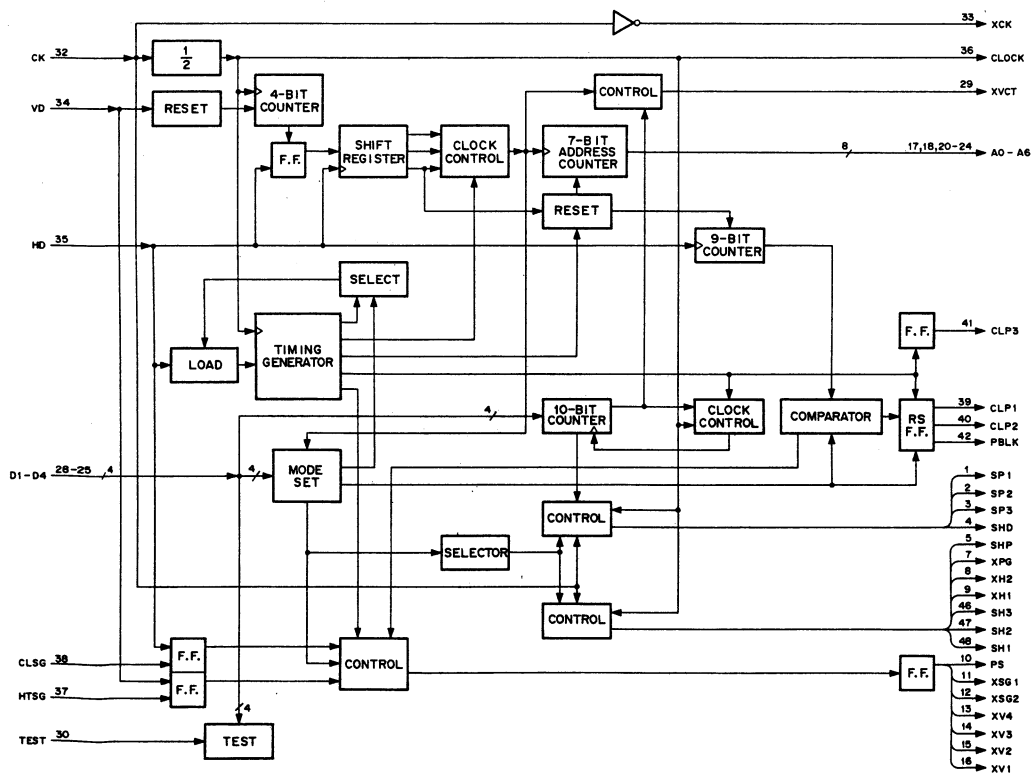
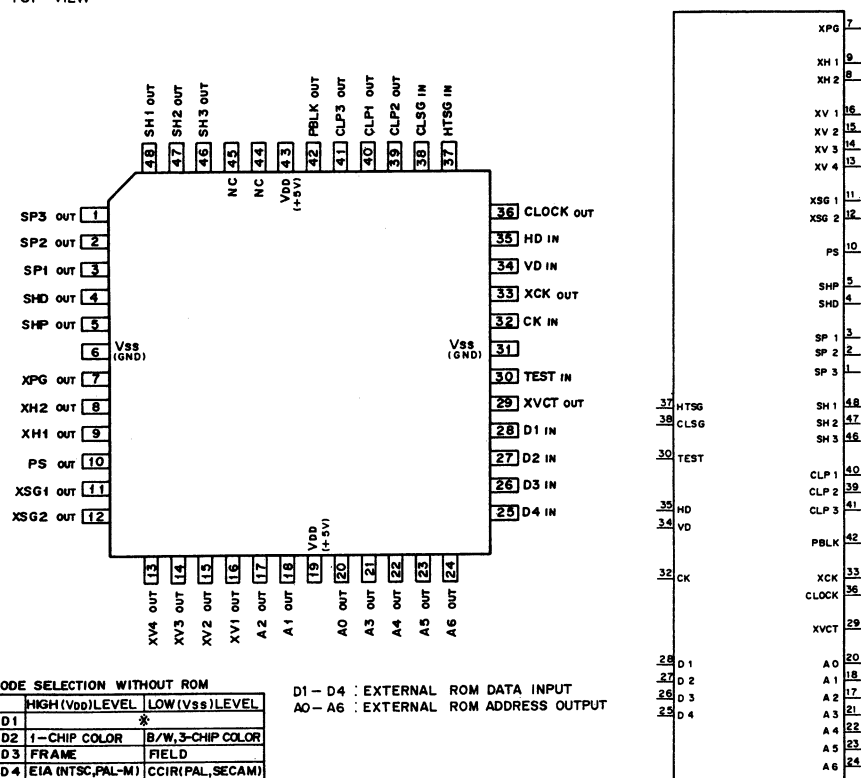
CXB0026AM (SONY) FLAT PACKAGE
DUAL INVERTING CLOCK DRIVER
- TOP VIEW -



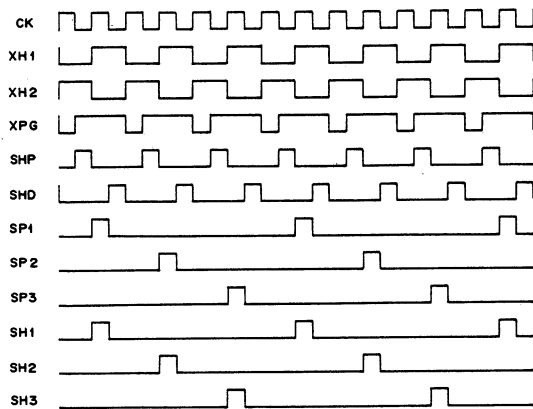
CXD1035BQ-Z (SONY) FLAT PACKAGE

CMOS TIMING PULSE GENERATOR FOR CCD CAMERA

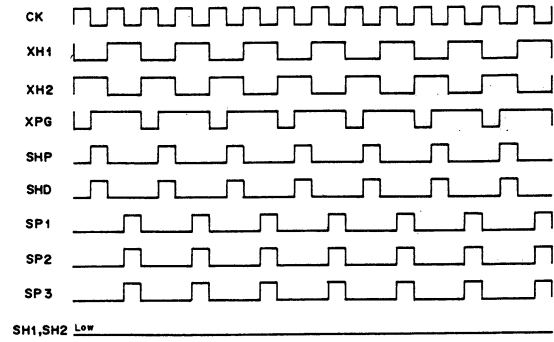
- TOP VIEW -



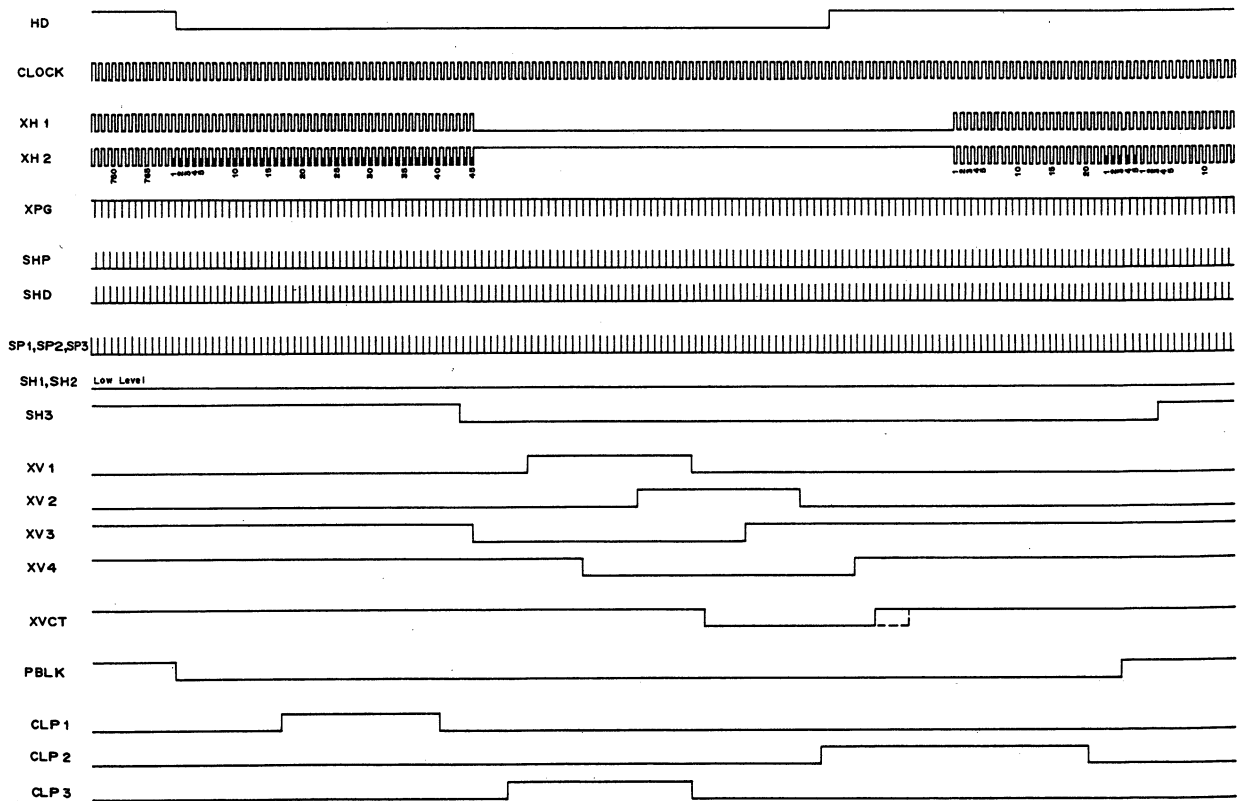
1-CHIP COLOR



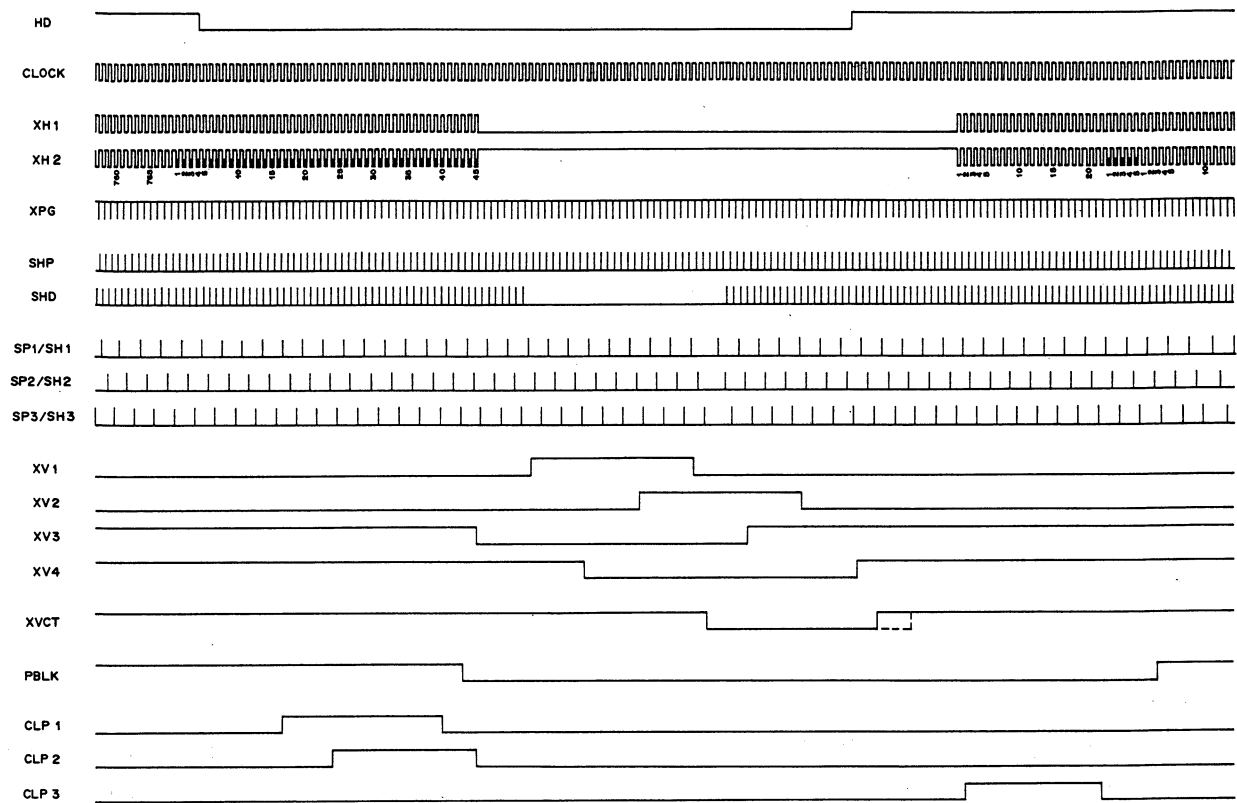
B/W, 3-CHIP COLOR



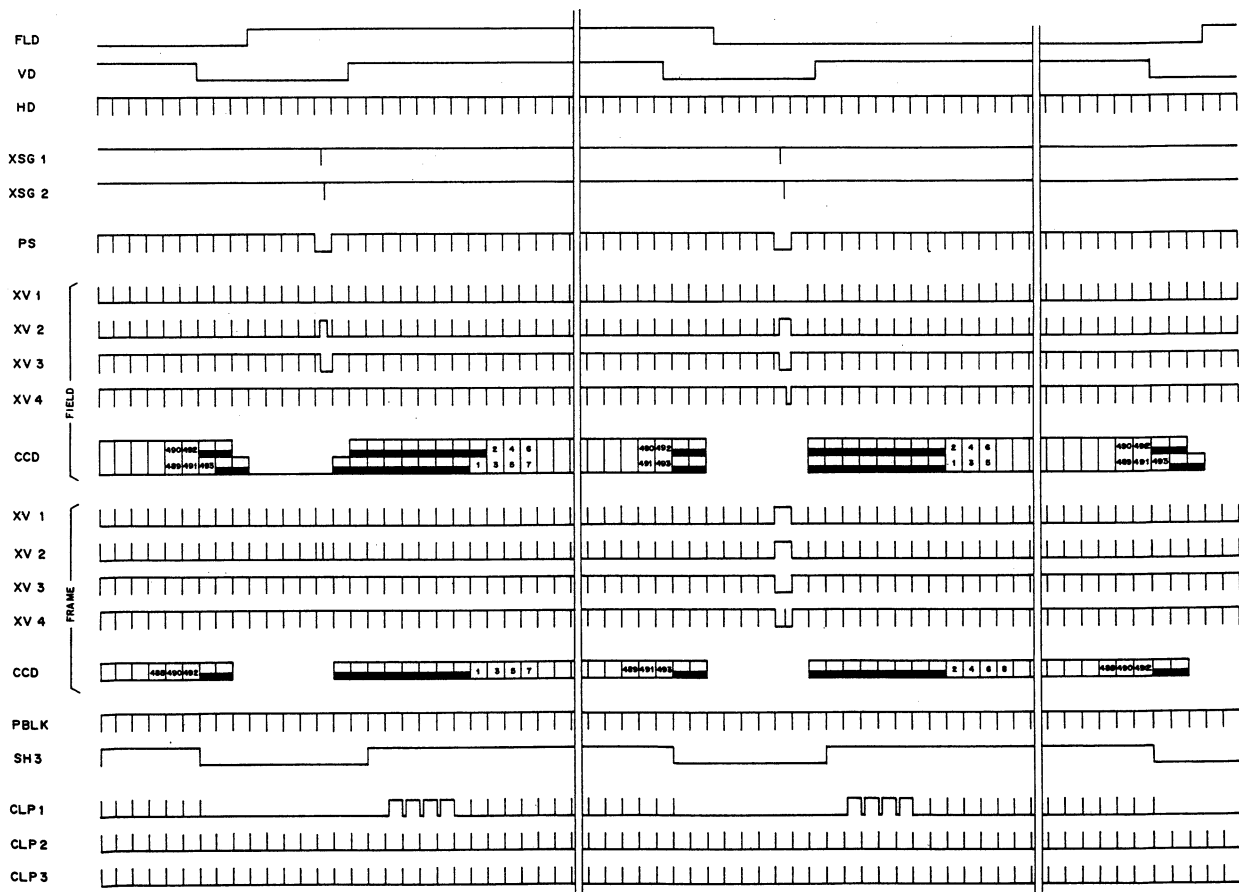
EIA (NTSC, PALM) B/W, 3-CHIP COLOR



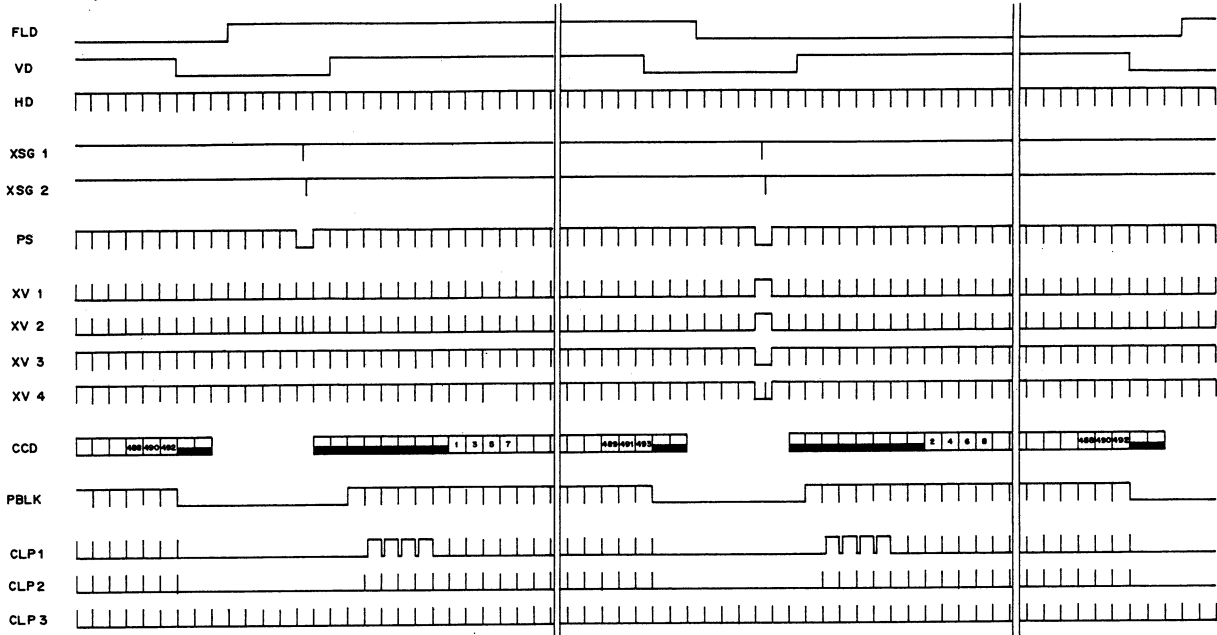
EIA(NTSC,PALM) 1-CHIP COLOR



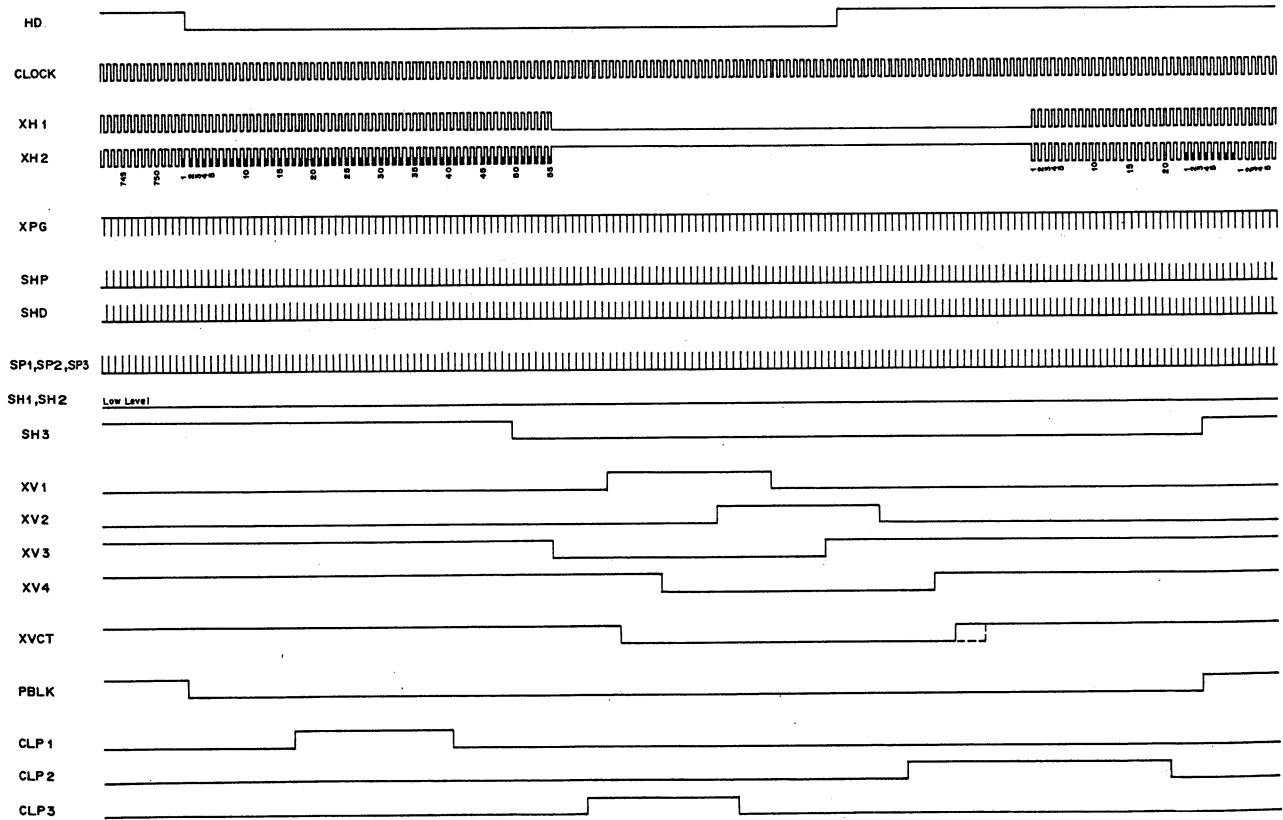
EIA(NTSC,PALM) B/W,3-CHIP COLOR



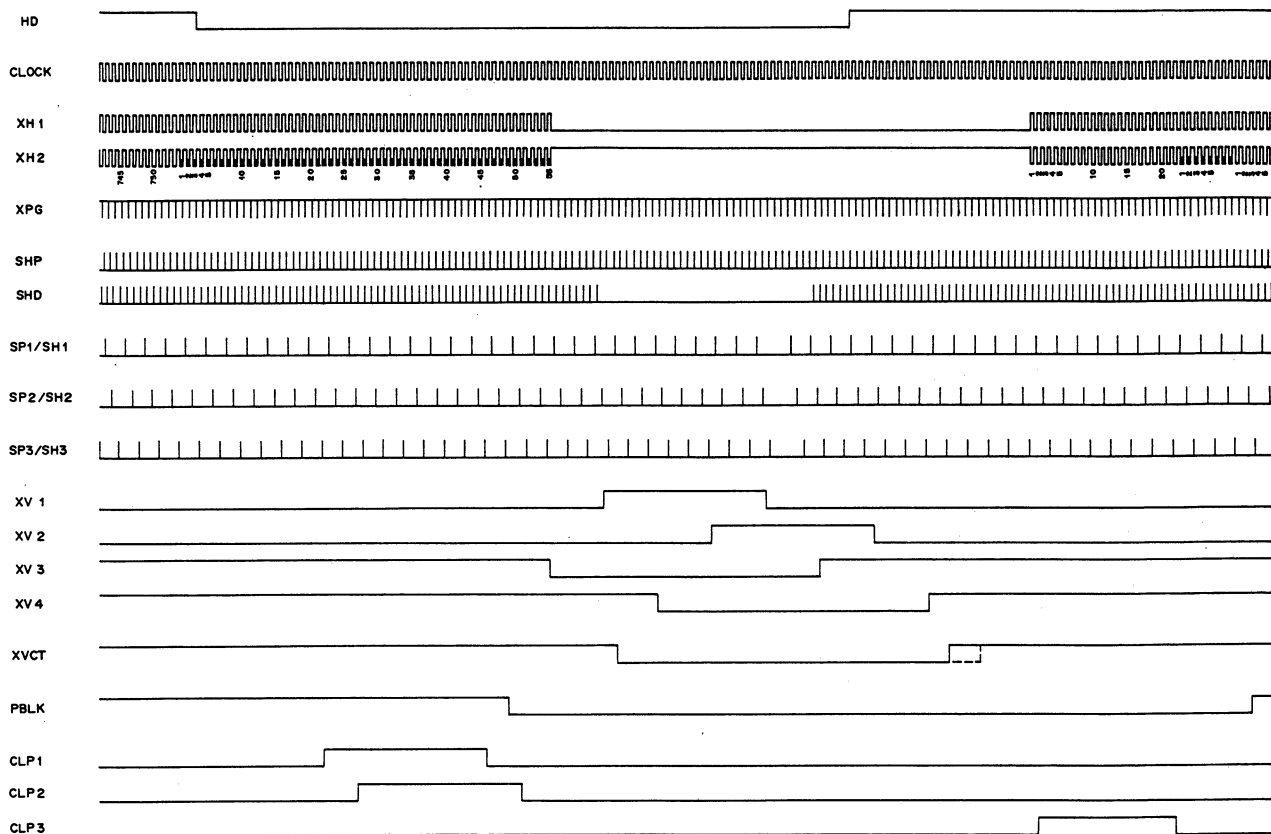
EIA (NTSC, PALM) 1-CHIP COLOR



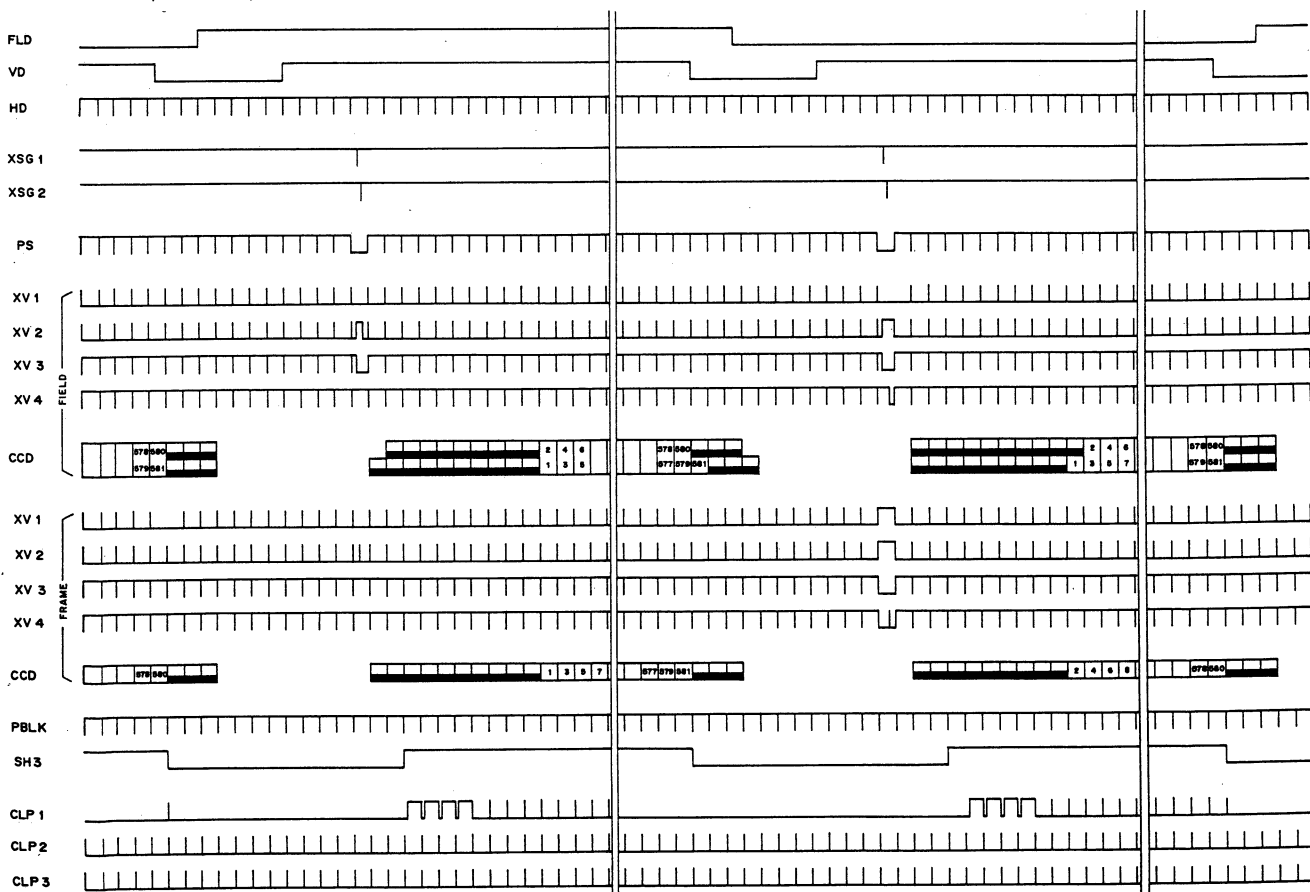
CCIR (PAL, SECAM) B/W, 3CHIP COLOR

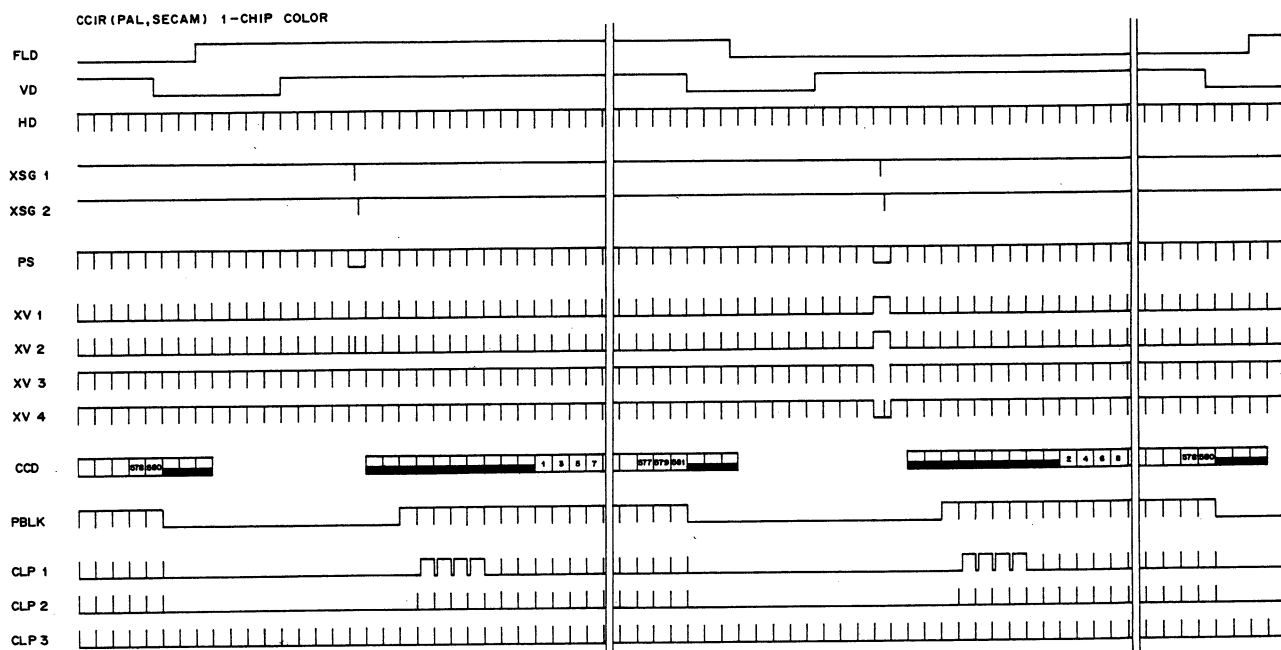


CCIR (PAL, SECAM) 1-CHIP COLOR

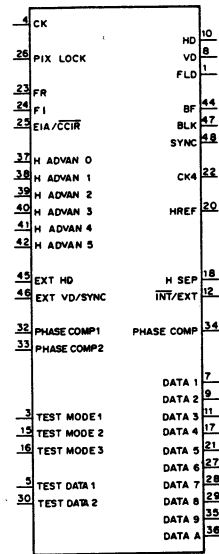
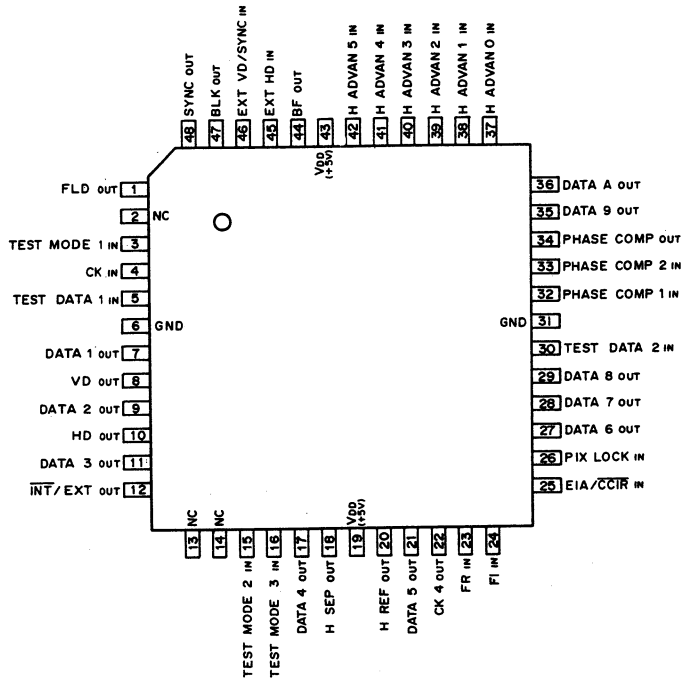


CCIR (PAL, SECAM) B/W, 3-CHIP COLOR



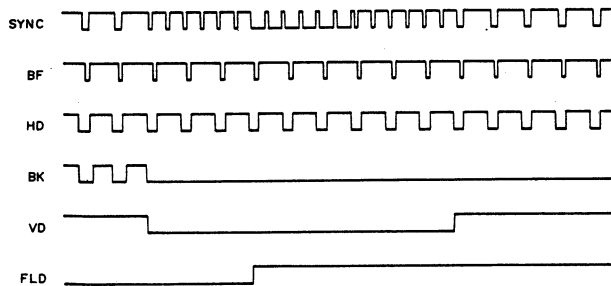


CXD1084Q-W (SONY) FLAT PACKAGE

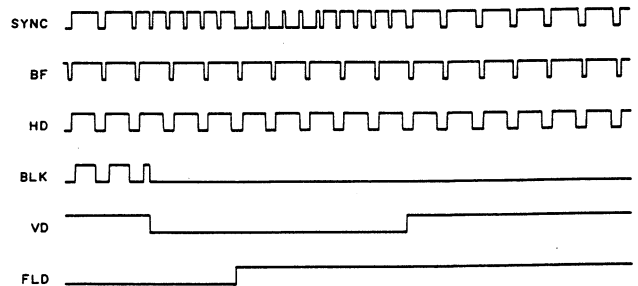
C-MOS SYNC GENERATOR FOR CCD B/W CAMERA
- TOP VIEW -

CK; EIA = 910Fh CCIR = 908Fh
 PIX LOCK; PIXEL LOCK MODE SELECT
 FR; FIELD RESET MODE SELECT
 FI; FIELD INVERSION MODE SELECT
 EXT HD; EXTERNAL HD
 EXT VD/SYNC; EXTERNAL VD or SYNC
 H ADVAN 0~5; H REF PULSE DELAY CONTROL DATA
 CK4; QUARTER CK PULSE

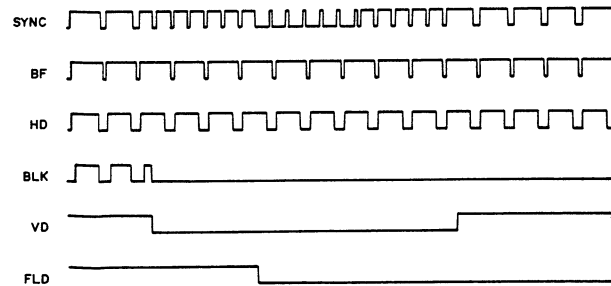
EIA (FIELD 1,3)



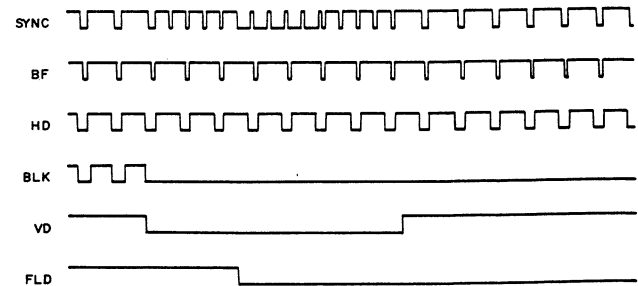
CCIR (FIELD 1,3)

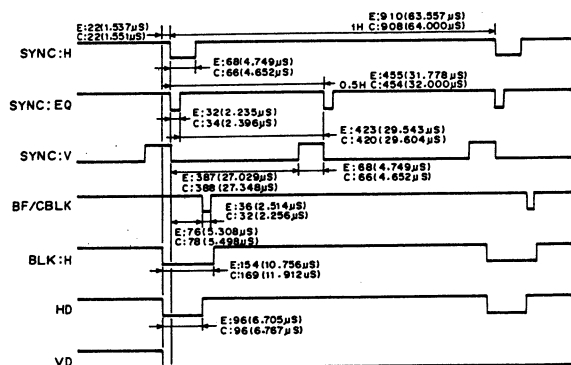


(FIELD 2,4)



(FIELD 2,4)



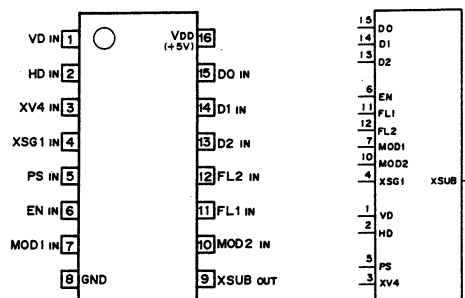


E : EIA
C : CCIR

* Values in parenthesis () are on the basis of the following clocks.
EIA CK : 14.31818MHz
CCIR CK : 14.1875MHz

CXD1141M (SONY)

C-MOS ELECTRIC SHUTTER TIMING PULSE GENERATOR - TOP VIEW -



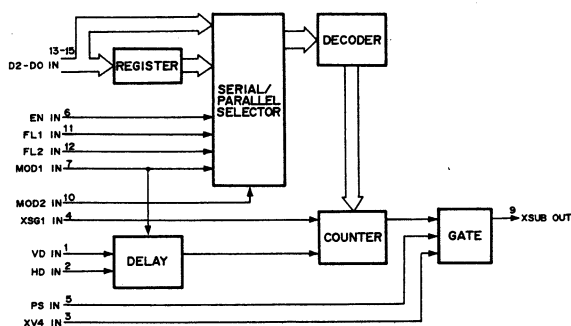
MODE SELECTION

EN	MOD1	MOD2	FL1	FL2	D2	D1	D0	SHUTTER SPEED
1	1	1	1		0	0	0	1/60
1	1	1	1		0	0	1	1/125
1	1	1	1		0	1	0	1/250
1	1	1	1		0	1	1	1/500
1	1	1	1		1	0	0	1/1000
1	1	1	1		1	0	1	1/2000
1	1	1	1		1	1	0	1/4000
1	1	1	1		1	1	1	1/10000
1	0	1	1		0	0	0	1/60
1	0	1	1		0	0	1	1/125
1	0	1	1		0	1	0	1/250
1	0	1	1		0	1	1	1/500
1	0	1	1		1	0	0	1/1000
1	0	1	1		1	0	1	1/2000
1	0	1	1		1	1	0	1/4000
1	0	1	1		1	1	1	1/10000
1	1		0	1				1/100
1	1		0	0				1/120
1	0		0	1				1/100
1	0		0	0				1/120
0								NORMAL

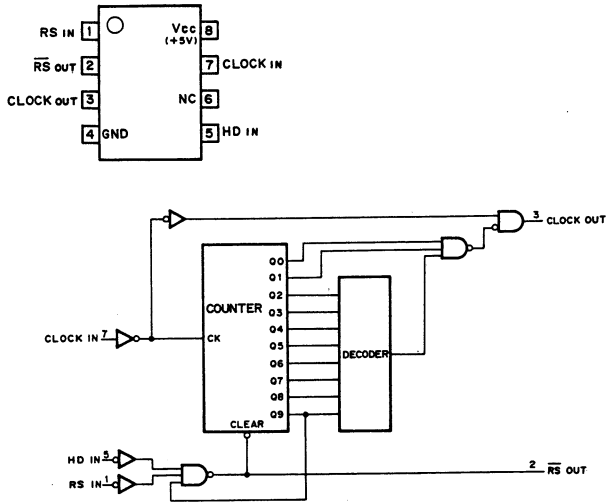
0: LOW LEVEL
1: HIGH LEVEL

D0-D3 ; ESTABLISH INPUTS OF SHUTTER SPEED

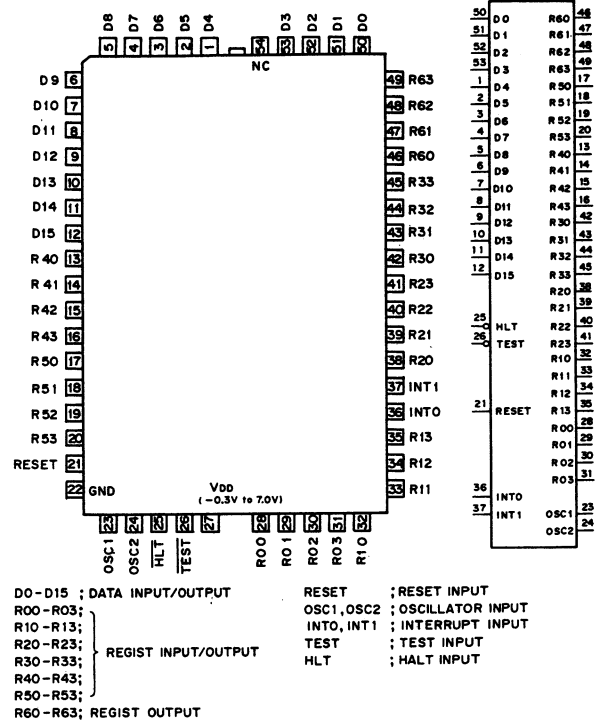
EN ; ENABLE INPUT LOW: NORMAL MODE, HIGH: ELECTRONIC SHUTTER MODE
FL1 ; MODE SELECT INPUT. LOW: FLICKERLESS, HIGH: NORMAL
FL2 ; MODE SELECT INPUT. LOW: 60HZ, HIGH: 50HZ
HD ; HORIZONTAL DRIVE PULSE INPUT
MOD1 ; MODE SELECT INPUT. LOW: PAL, HIGH: NTSC
MOD2 ; MODE SELECT INPUT. LOW: SERIAL INPUT, HIGH: PARALLEL INPUT
PS ; POWER SAVE PULSE INPUT
VD ; VERTICAL DRIVE PULSE INPUT
XSG1 ; READ OUT PULSE INPUT OF SENSOR ELECTRON
XSUB ; ELECTRON SWEEP OUT PULSE INPUT
XV4 ; VERTICAL SCAN CLOCK INPUT



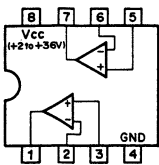
CXD1361M (TI) FLAT PACKAGE
CLOCK CONTROLLER
- TOP VIEW -



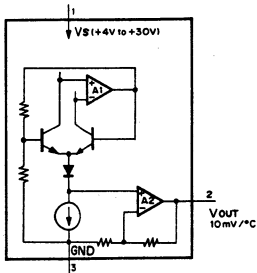
HD44860B42 (HITACHI) FLAT PACKAGE
C-MOS 4-BIT MICROPROCESSOR
- TOP VIEW -



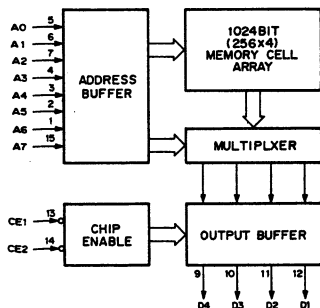
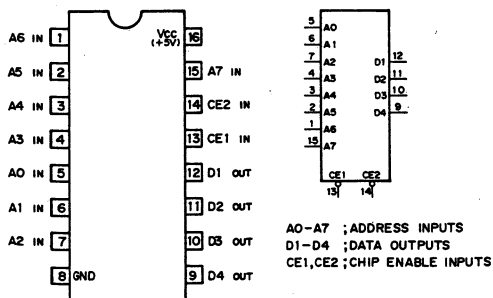
LM2903M (RAYTHEON) FLAT PACKAGE
DUAL VOLTAGE COMPARATORS
- TOP VIEW -



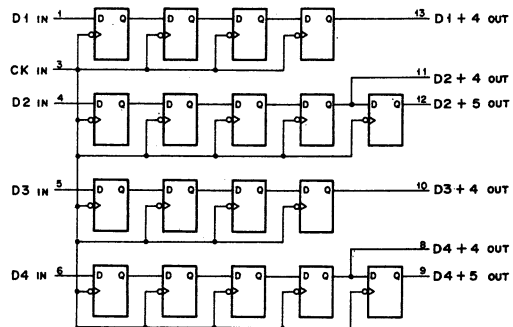
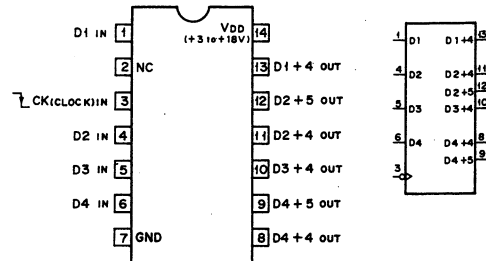
LM35DZ (NS)
BIPOLAR TEMPERATURE SENSOR



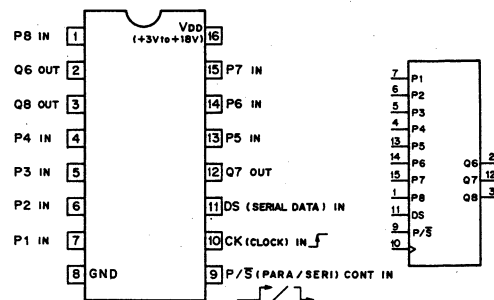
MB7114LPF (FUJITSU) (ACCESS TIME = 50nS) FLAT PACKAGE
TTL 1024-BIT (256x4) PROM
- TOP VIEW -



MC14006BF (MOTOROLA) FLAT PACKAGE
C-MOS 18-BIT STATIC SHIFT REGISTER
- TOP VIEW -

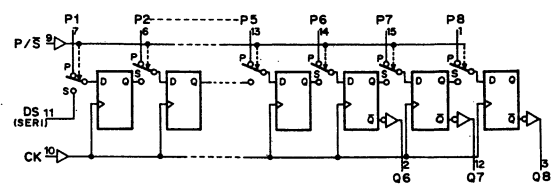


MC14014BF (MOTOROLA) FLAT PACKAGE
C-MOS SYNCHRONOUS SERIAL/PARALLEL 8-BIT STATIC SHIFT REGISTER
- TOP VIEW -

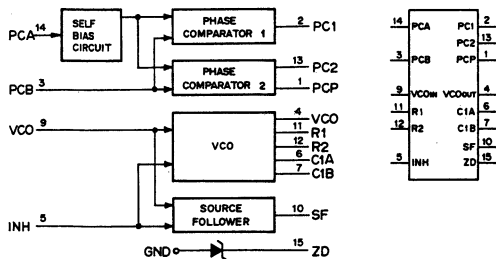
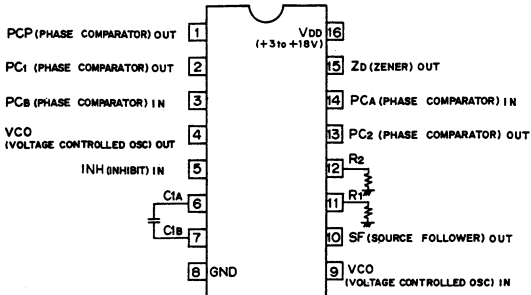


t _n				t _n + 1			
INPUTS				INTERNAL OUTPUTS			
P/S CONT	CK	P	DS	Q1	Q2	Q3	Q4
1	f	P1~P8	X	P1	P2	P3	P4
0	f	X	1	1	Q1n	Q2n	Q3n
0	f	X	0	0	Q1n	Q2n	Q3n
X	0	X	X	Q1n	Q2n	Q3n	Q4n

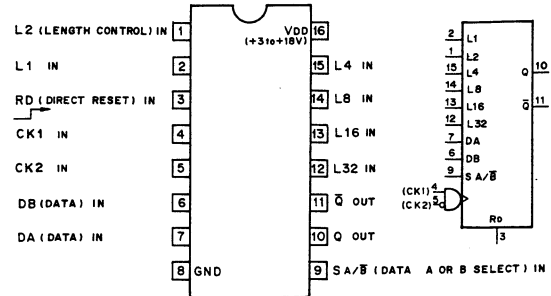
0; LOW LEVEL X; DON'T CARE. t_n; BEFORE CLOCK
1; HIGH LEVEL t_n + 1; AFTER CLOCK



MC14046BF (MOTOROLA) FLAT PACKAGE
C-MOS PHASE LOCKED LOOP
- TOP VIEW -



MC14557BF (MOTOROLA) FLAT PACKAGE
C-MOS 1-TO-64-BIT VARIABLE LENGTH SHIFT REGISTER
- TOP VIEW -



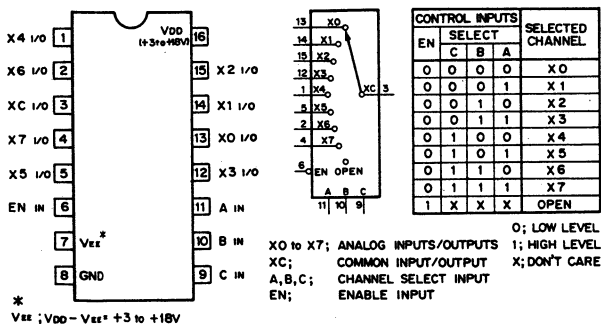
LENGTH SELECT TRUTH TABLE

L32	L16	L8	L4	L2	L1	REGISTER LENGTH
0	0	0	0	0	0	1 - BIT
0	0	0	0	0	1	2 - BIT
0	0	0	0	1	0	3 - BIT
0	0	0	0	1	1	4 - BIT
0	0	0	1	0	0	5 - BIT
...	...	...	...	...	...	...
1	1	1	1	0	0	61 - BIT
1	1	1	1	0	1	62 - BIT
1	1	1	1	1	0	63 - BIT
1	1	1	1	1	1	64 - BIT

INPUTS			OUTPUT
RD	SA/B	CK1 CK2	Q
0	0	0	DB
0	1	0	DA
0	1	1	DB
0	1	1	DA
1	X	X	0

0: LOW LEVEL
1: HIGH LEVEL
X: DON'T CARE

MC14051BF (MOTOROLA) FLAT PACKAGE
TC4051BF (TOSHIBA) FLAT PACKAGE
C-MOS 8-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
- TOP VIEW -



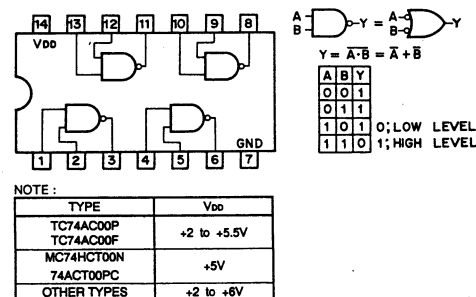
CONTROL INPUTS				SELECTED CHANNEL
EN	SELECT	C	B A	
0	0	0	0	X0
0	0	0	1	X1
0	0	1	0	X2
0	0	1	1	X3
0	1	0	0	X4
0	1	0	1	X5
0	1	1	0	X6
0	1	1	1	X7
1	X	X	X	OPEN

0: LOW LEVEL
1: HIGH LEVEL
X: DON'T CARE

X0 to X7: ANALOG INPUTS/OUTPUTS
XC: COMMON INPUT/OUTPUT
A, B, C: CHANNEL SELECT INPUT
EN: ENABLE INPUT

* $V_{EE} = V_{DD} - V_{ES} + 3 \text{ to } +18\text{V}$

MC74HC00AF (MOTOROLA) FLAT PACKAGE
TC74HC00F (TOSHIBA) FLAT PACKAGE
C-MOS QUAD 2-INPUT NAND GATE
- TOP VIEW -



$$Y = \overline{A \cdot B} = \overline{A} + \overline{B}$$

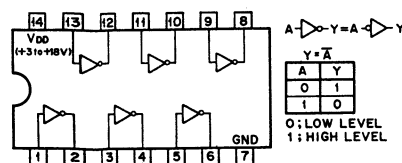
A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0: LOW LEVEL
1: HIGH LEVEL

NOTE:

TYPE	VDD
TC74AC00P	+2 to +5.5V
TC74AC00F	+2 to +5.5V
MC74HCT00N	+5V
74ACT00PC	+5V
OTHER TYPES	+2 to +6V

MC14069UBF (MOTOROLA)
TC4069UBF (TOSHIBA) FLAT PACKAGE
C-MOS INVERTER
- TOP VIEW -

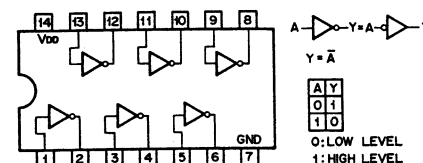


$$Y = \overline{A}$$

A	Y
0	1
1	0

0: LOW LEVEL
1: HIGH LEVEL

MC74HC04F (MOTOROLA) FLAT PACKAGE
TC74HC04F (TOSHIBA) FLAT PACKAGE
C-MOS HEX INVERTER
- TOP VIEW -



$$Y = \overline{A}$$

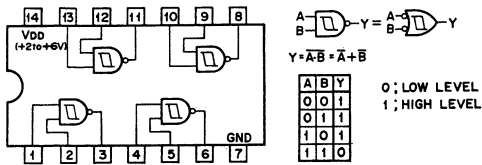
A	Y
0	1
1	0

0: LOW LEVEL
1: HIGH LEVEL

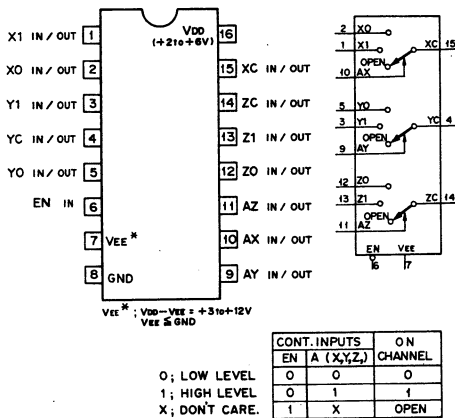
NOTE:

TYPE	VDD
74ACT04 TYPES	+5V
74HCT04 TYPES	+5V
TC74AC04F	+2 to +5.5V
TC74HCT04F	+4.5 to +5.5V
OTHER TYPES	+2 to +6V

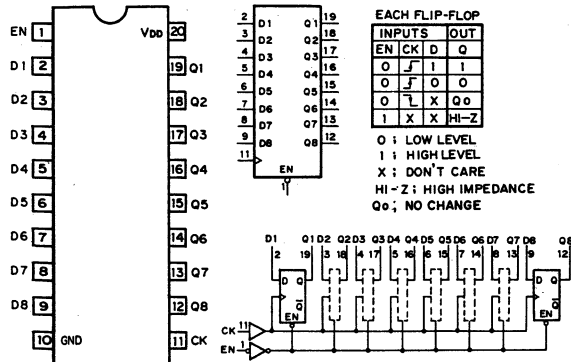
MC74HC132F (MOTOROLA) FLAT PACKAGE
C-MOS 2-INPUT NAND SCHMITT TRIGGER
- TOP VIEW -



MC74HC4053F (MOTOROLA) FLAT PACKAGE
C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
- TOP VIEW -



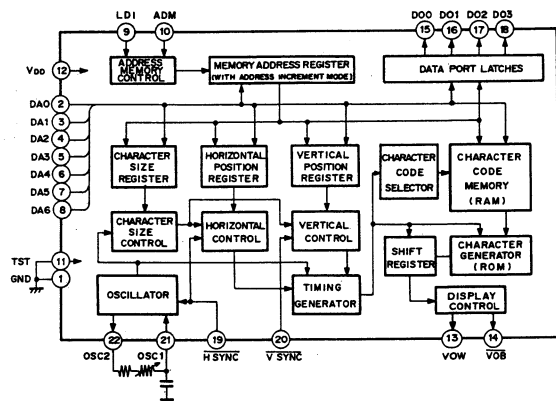
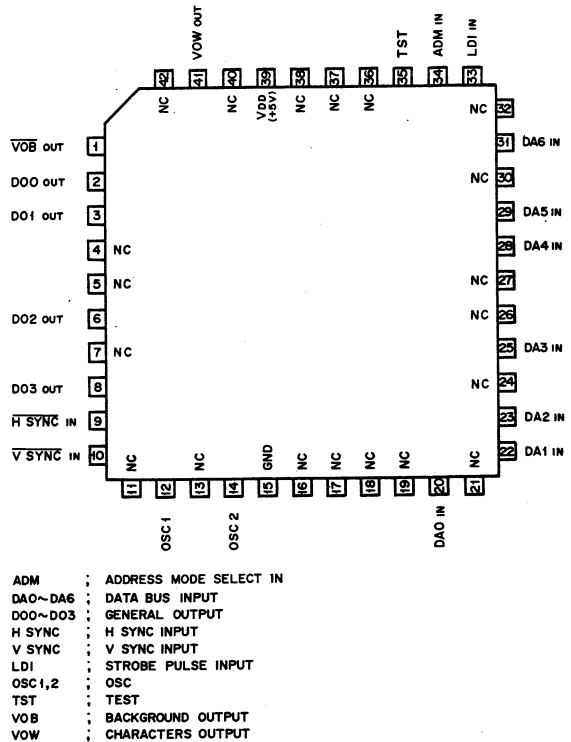
MC74HC574F (MOTOROLA) FLAT PACKAGE
SN74HC574NS (TI) FLAT PACKAGE
C-MOS 3-STATE D-TYPE EDGE-TRIGGERED FLIP-FLOP
- TOP VIEW -



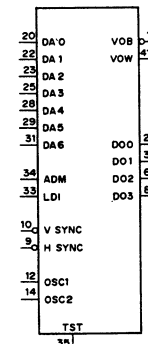
NOTE:

TYPE	V _{DD}
T4AC/T4HC	+2 to +6V
T4ACT/T4HCT	+5V
TC74AC574F	+2 to +5.5V

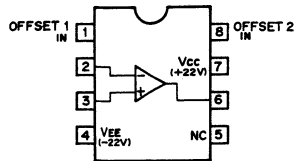
MN1237A (MATSUSHITA) FLAT PACKAGE
C-MOS INDICATES DATA OF 60 CHARACTERS CRT INTERFACE
- TOP VIEW -



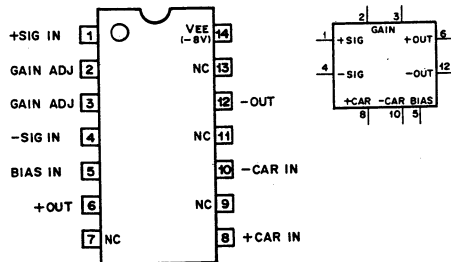
DA3	DA2	DA1	DA0	DA3	DA2	DA1	DA0
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	0
0	0	1	1	0	0	1	1
0	1	0	0	0	1	0	0
0	1	0	1	0	1	0	1
0	1	1	0	0	1	1	0
0	1	1	1	0	1	1	1
1	0	0	0	1	0	0	0
1	0	0	1	1	0	0	1
1	0	1	0	1	0	1	0
1	0	1	1	1	0	1	1
1	1	0	0	1	1	0	0
1	1	0	1	1	1	0	1
1	1	1	0	1	1	1	0
1	1	1	1	1	1	1	1



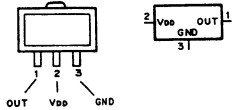
OP-07DPS (TI) FLAT PACKAGE
OPERATIONAL AMPLIFIER
- TOP VIEW -



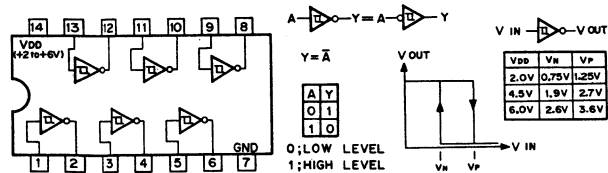
RC1496M (RAYTHEON) FLAT PACKAGE
BALANCED MODULATOR/DEMULATOR
- TOP VIEW -



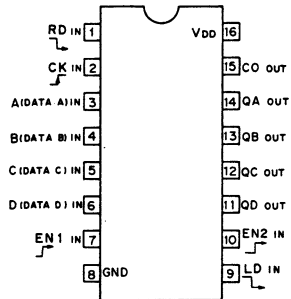
S-8054ALR-LN (SEIKO)
CMOS VOLTAGE DETECTOR
- TOP VIEW -



SN74HC14NS (TI) FLAT PACKAGE
TC74HC14F (TOSHIBA) FLAT PACKAGE
CMOS SCHMITT TRIGGER INVERTER
- TOP VIEW -

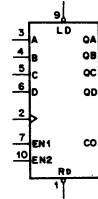


SN74HC163NS (TI) FLAT PACKAGE
TC74HC163F (TOSHIBA) FLAT PACKAGE
CMOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
- TOP VIEW -



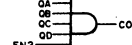
NOTE:

TYPE	V _{DD}
74ACT	+5V
TC74AC163F	+2 to +5.5V
OTHER TYPES	+2 to +6V



MODE SELECTION				MODE
Rd	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

CARRY OUTPUT "CO"

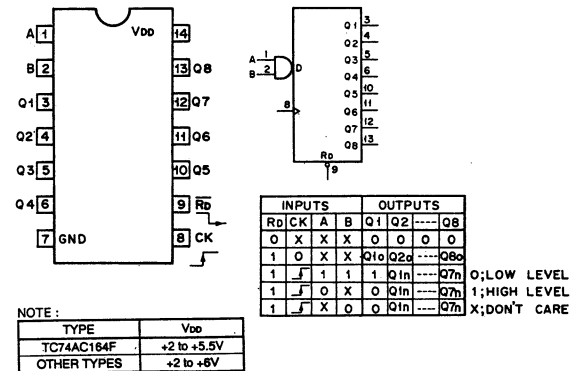


CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

COUNT SEQUENCE

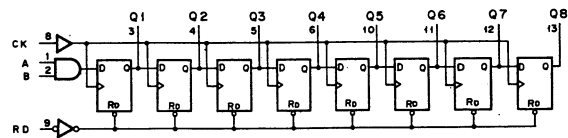
COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

SN74HC164NS (TI) FLAT PACKAGE
TC74HC164F (TOSHIBA) FLAT PACKAGE
CMOS 8-BIT SERIAL-IN/PARALLEL-OUT SHIFT REGISTER
- TOP VIEW -

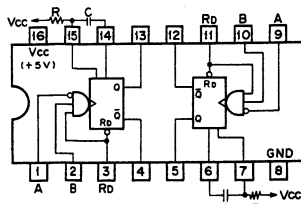


NOTE:

TYPE	V _{DD}
TC74AC164F	+2 to +5.5V
OTHER TYPES	+2 to +6V



SN74LS123NS (TI) FLAT PACKAGE

TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
- TOP VIEW -

INPUTS		OUTPUTS	
Rd	A B	Q	Q̄
0	X X	0	1
X	1 X	0	1
X	X 0	0	1
1	0 1	1	0
1	1 1	1	0
1	0 1	1	0

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH

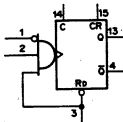
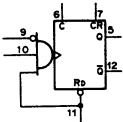
$$t_{123}; T_w = 0.28 \left(1 + \frac{Z_{OD}}{R}\right) CR$$

$$t_{123}; T_w = 0.33 \left(1 + \frac{Z_{OD}}{R}\right) CR$$

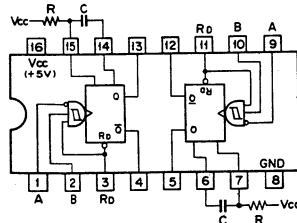
$$t_{123}; T_w = 0.25 \left(1 + \frac{Z_{OD}}{R}\right) CR$$

$$t_{123}; T_w = 0.29 \left(1 + \frac{Z_{OD}}{R}\right) CR$$

$$t_{LS123}; T_w = 0.45 CR$$



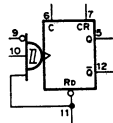
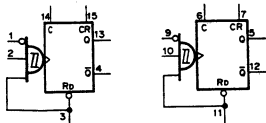
SN74LS221NS (TI) FLAT PACKAGE

TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
- TOP VIEW -

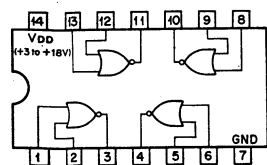
INPUTS		OUTPUTS	
Rd	A B	Q	Q̄
0	X X	0	1
X	1 X	0	1
X	X 0	0	1
1	0 1	1	0
1	1 1	1	0
1	0 1	1	0

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH = 0.7CR



TC4001BF (TOSHIBA) FLAT PACKAGE

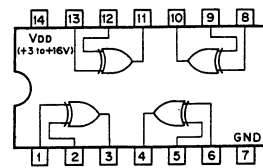
C-MOS 2-INPUT NOR GATE
- TOP VIEW -

$$Y = \overline{A + B} = \overline{A} \cdot \overline{B}$$

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

TC4030BFHB (TOSHIBA) FLAT PACKAGE

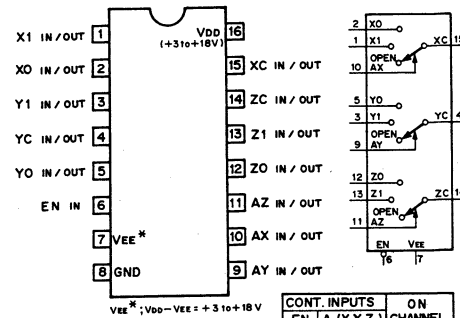
C-MOS EXCLUSIVE OR GATE
- TOP VIEW -

$$Y = \overline{A \cdot B} + \overline{A \cdot B}$$

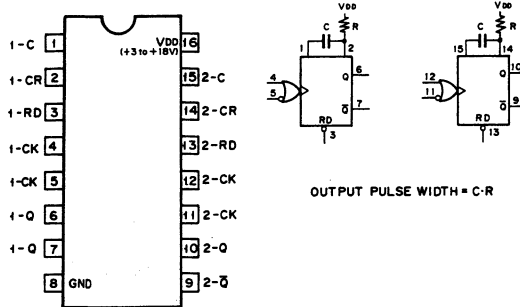
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

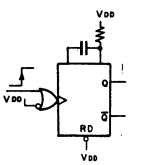
TC4053BFHB (TOSHIBA) FLAT PACKAGE

C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
- TOP VIEW -

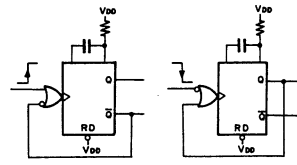
TC4538BF (TOSHIBA) FLAT PACKAGE

C-MOS DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
- TOP VIEW -

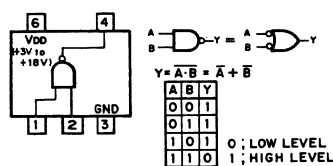
RETRIGGERABLE M.M.V



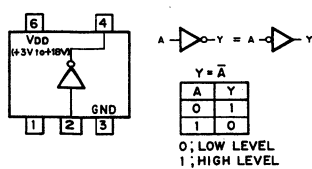
NON - RETRIGGERABLE M.M.V



TC4511F (TOSHIBA) FLAT PACKAGE

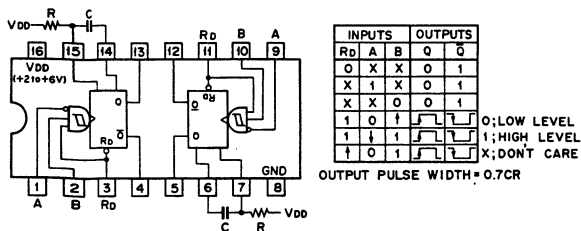
C-MOS 2-INPUT NAND GATE
- TOP VIEW -

TC4569F (TOSHIBA) FLAT PACKAGE

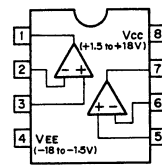
C-MOS INVERTER BUFFER
- TOP VIEW -

TC74HC221AF (TOSHIBA) FLAT PACKAGE

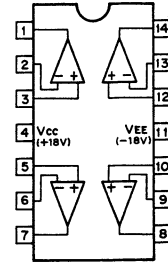
UPD74HC221AGS (NEC) FLAT PACKAGE

C-MOS MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
- TOP VIEW -

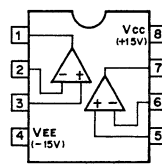
TL062CPS (TI) FLAT PACKAGE

OPERATIONAL AMPLIFIER
(JFET INPUT)
- TOP VIEW -

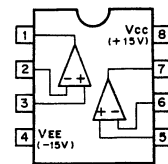
TL064CNS (TI) FLAT PACKAGE

OPERATIONAL AMPLIFIER
(J FET-INPUT)
- TOP VIEW -

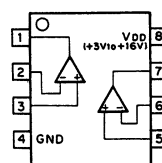
TL072CPS (TI) FLAT PACKAGE

OPERATIONAL AMPLIFIER
(LOW-NOISE, JFET-INPUT)
- TOP VIEW -

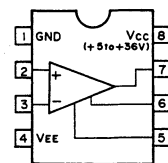
TL082CPS (TI) FLAT PACKAGE

OPERATIONAL AMPLIFIER
(J FET-INPUT)
- TOP VIEW -

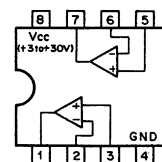
TLC27L2CPS (TI) FLAT PACKAGE

OPERATIONAL AMPLIFIER
- TOP VIEW -

UPC311G2 (NEC) FLAT PACKAGE

VOLTAGE COMPARATOR
- TOP VIEW -

UPC358G2 (NEC) FLAT PACKAGE

DUAL OPERATIONAL AMPLIFIERS
- TOP VIEW -

CHAPTER 7

REPAIR PARTS

[NOTE]

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- All resistors are in ohms.

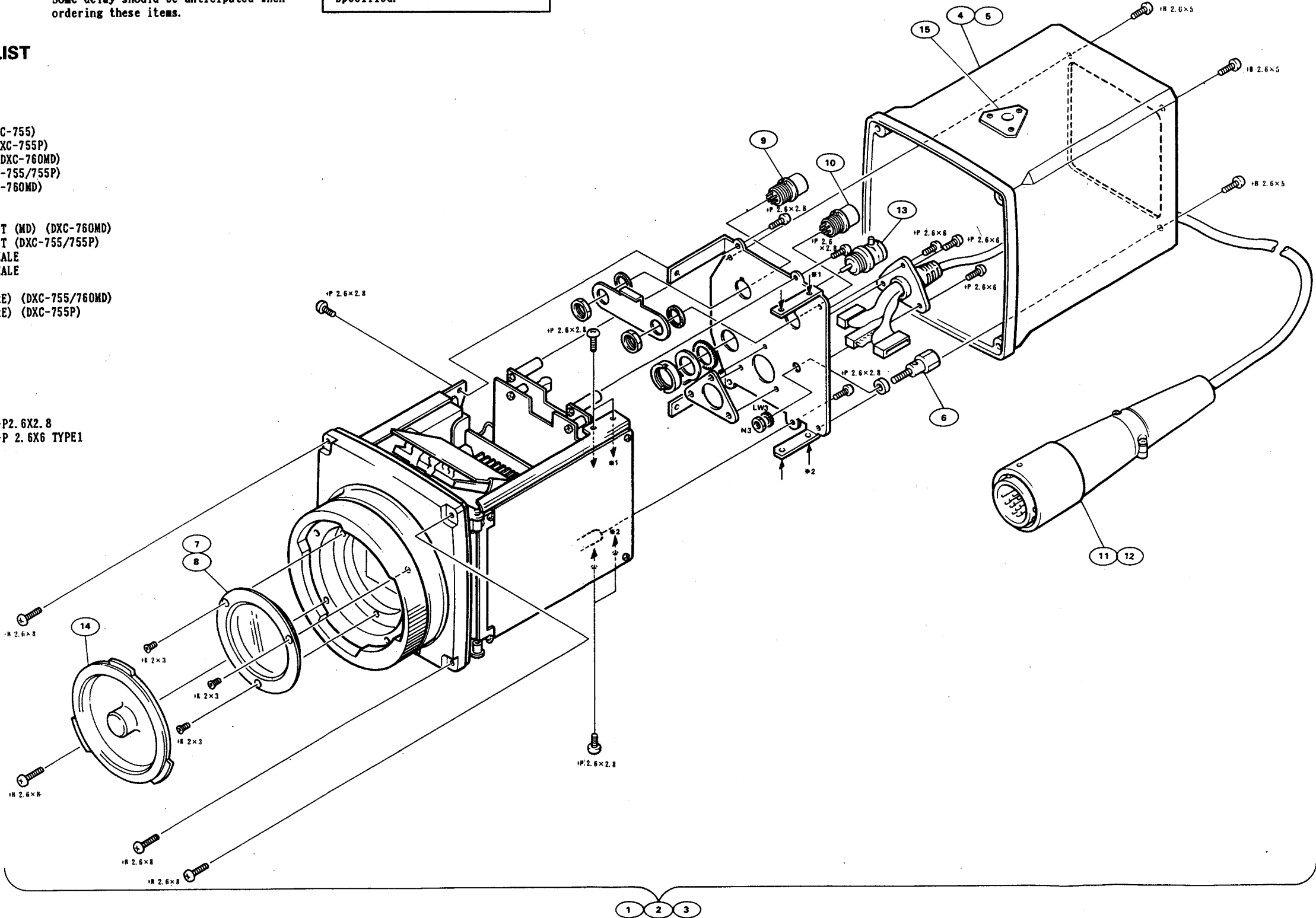
- Items marked "o" in the SP column are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by mark  are critical for safety. Replace only with part number specified.

7-1. MECHANICAL PARTS LIST

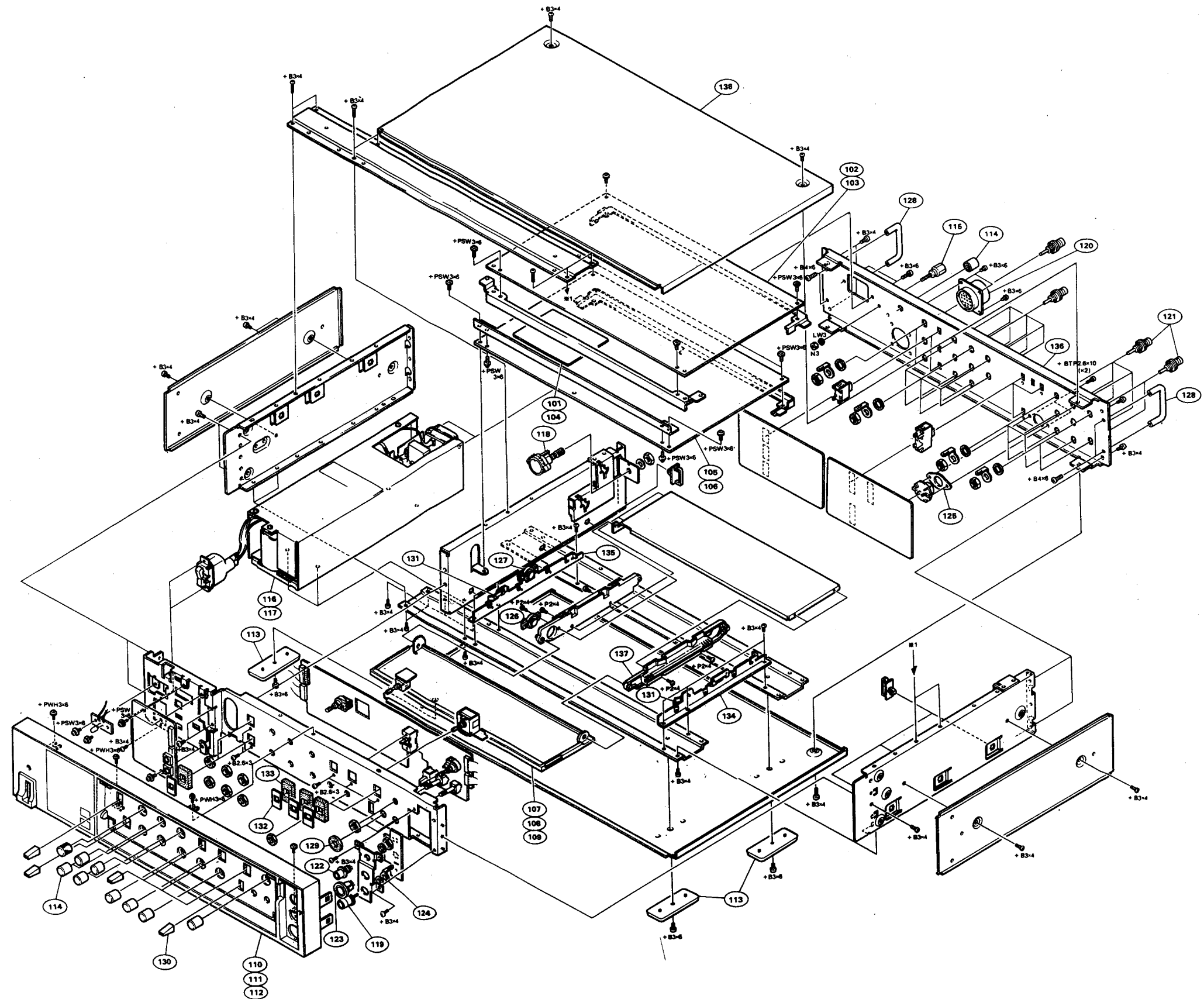
7-1-1. Camera Head Unit

No.	Part No.	SP Description
1	A-7575-175-A	s CCD UNIT-C755 (DXC-755)
2	A-7575-176-A	s CCD UNIT-C755P (DXC-755P)
3	A-7575-177-A	s CCD UNIT-C755MD (DXC-760MD)
4	X-3726-908-1	o CABINET ASSY (DXC-755/755P)
5	X-3726-910-1	o CABINET ASSY (DXC-760MD)
6	X-4801-204-0	o TERMINAL ASSY
7	1-547-311-11	s FILTER UNIT, FRONT (MD) (DXC-760MD)
8	1-547-312-11	s FILTER UNIT, FRONT (DXC-755/755P)
9	1-562-222-21	s CONNECTOR 6P, FEMALE
10	1-563-929-11	s CONNECTOR 4P, FEMALE
11	1-574-266-21	s CABLE ASSY(17 CORE) (DXC-755/760MD)
12	1-574-266-31	s CABLE ASSY(17 CORE) (DXC-755P)
13	1-580-724-11	s CONNECTOR, BNC
14	3-699-048-01	s CAP, MOUNT
15	3-726-901-01	s SCREW, TRIPOD
	7-621-770-87	s SCREW +B 2.6X5
	7-621-770-99	s SCREW +B 2.6X8
	7-623-422-07	s LW 3, TYPE B
	7-627-556-07	s SCREW,PRECISION +P2.6X2.8
	7-627-556-78	s SCREW,PRECISION +P 2.6X6 TYPE1
	7-684-023-04	s N 3, TYPE 2



7-1-2. Camera Control Unit

No.	Part No.	SP Description
101	A-7513-953-A	o MOUNTED CIRCUIT BOARD, SG-150P (DXC-755P)
102	A-7515-330-A	o MOUNTED CIRCUIT BOARD, PR-162N (DXC-755/760MD)
103	A-7515-332-A	o MOUNTED CIRCUIT BOARD, PR-162P (DXC-755P)
104	A-7615-259-A	o MOUNTED CIRCUIT BOARD, SG-150N (DXC-755/760MD)
105	A-7615-266-A	o MOUNTED CIRCUIT BOARD, SG-198N ASSY (DXC-755/760MD)
106	A-7615-333-A	o MOUNTED CIRCUIT BOARD, SG-198P ASSY (DXC-755P)
107	X-3165-839-1	o DOOR ASSY, FRONT (DXC-755)
108	X-3165-840-1	o DOOR ASSY, FRONT (DXC-755P)
109	X-3165-841-1	o DOOR ASSY (MD), FRONT (DXC-760MD)
110	X-3165-842-1	o PANEL ASSY, FRONT (DXC-760MD)
111	X-3165-843-1	o PANEL ASSY, FRONT (DXC-755P)
112	X-3165-844-1	o PANEL ASSY, FRONT (DXC-755)
113	X-3565-417-0	o LEG ASSY
114	X-3682-814-0	o KNOB ASSY, CONTROL
115	X-4801-204-0	o TERMINAL ASSY
116	Δ 1-413-383-32	s REGULATOR, SWITCHING (DXC-755P)
117	Δ 1-413-383-41	s REGULATOR, SWITCHING (DXC-755/760MD)
118	1-516-075-13	s SWITCH, ROTARY
119	1-561-336-00	s CONNECTOR, COAXIAL
120	1-562-245-00	o CONNECTOR 26P, FEMALE
121	1-562-261-51	s CONNECTOR, COAXIAL (BNC)
122	1-563-929-11	s CONNECTOR 4P, FEMALE
123	1-565-653-11	s CONNECTOR 8P, FEMALE
124	2-286-707-00	o LUG, BNC
125	2-381-936-01	o GUIDE, SOCKET
126	3-319-224-21	s DAMPER, SMALL
127	3-319-224-31	s DAMPER, SMALL
128	3-648-409-00	o HANDLE, (1)
129	3-661-624-00	s SHEET (W), BLIND
130	3-717-382-01	s KNOB, LEVER SW
131	3-726-917-01	o SPRING
132	3-726-919-01	o PLATE, SW, LEVER
133	3-726-920-01	o PACKING
134	3-726-930-01	s GUIDE (RIGHT), SLIDE
135	3-726-931-01	s GUIDE (LEFT), SLIDE
136	3-726-939-01	o PANEL, REAR
137	3-726-944-01	s RAIL, SLIDE
138	3-726-946-01	o COVER
7-621-255-25	s SCREW +P 2X4	
7-623-308-07	s LW 3, TYPE (A)	
7-682-545-04	s SCREW +B 3X4	
7-682-547-04	s SCREW +B 3X6	
7-682-560-04	s SCREW +B 4X6	
7-682-903-11	s SCREW +PWH 3X6	
7-682-947-01	s SCREW +PSW 3X6	
7-684-023-04	s N 3, TYPE 2	
7-685-535-14	s SCREW +BTP 2.6X10 TYPE2 N-S	



7-2. ELECTRICAL PARTS LIST

- Safety Related Components Warning.
Components identified by Δ marking on the schematic diagrams and repair parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.
- Replacement Parts supplied from Sony Parts Center will sometimes have a different shape from the original parts. This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts." This manual's repair parts list indicate the parts numbers of "the standardized genuine parts at present." Regarding engineering parts changes in our engineering department refer to Sony service bulletins and service manual supplements.
- Items marked "s" in the SP column of the parts list are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Abbreviations

Ref. No.	Description
C□□, CV□□ R□□, RV□□	CAPACITOR RESISTOR

- Units for Capacitors, Inductors and Resistors.
The following units are assumed in schematic diagrams and repair parts list unless otherwise specified:
Capacitors: μ F or pF
Inductors : μ H
Resistors : Ω
- Parts that are not listed in the "Reference numbers order list" are shown in following list reference are omitted.

RESISTOR, CHIP

Part No. SP Description

1-216-295-00	s	CHIP	0	5%	1/10W
1-216-298-00	s	CHIP	2.2	5%	1/10W
1-216-302-00	s	CHIP	2.7	5%	1/10W
1-216-304-00	s	CHIP	3.3	5%	1/10W
1-216-306-00	s	CHIP	3.9	5%	1/10W
1-216-308-00	s	CHIP	4.7	5%	1/10W
1-216-309-00	s	CHIP	5.6	5%	1/10W
1-216-311-00	s	CHIP	6.8	5%	1/10W
1-216-313-00	s	CHIP	8.2	5%	1/10W
1-216-001-00	s	CHIP	10	5%	1/10W
1-216-003-00	s	CHIP	12	5%	1/10W
1-216-005-00	s	CHIP	15	5%	1/10W
1-216-007-00	s	CHIP	18	5%	1/10W
1-216-009-00	s	CHIP	22	5%	1/10W
1-216-011-00	s	CHIP	27	5%	1/10W
1-216-013-00	s	CHIP	33	5%	1/10W
1-216-015-00	s	CHIP	39	5%	1/10W
1-216-017-00	s	CHIP	47	5%	1/10W
1-216-019-00	s	CHIP	56	5%	1/10W
1-216-021-00	s	CHIP	68	5%	1/10W
1-216-023-00	s	CHIP	82	5%	1/10W
1-216-025-00	s	CHIP	100	5%	1/10W
1-216-027-00	s	CHIP	120	5%	1/10W
1-216-029-00	s	CHIP	150	5%	1/10W
1-216-031-00	s	CHIP	180	5%	1/10W
1-216-033-00	s	CHIP	220	5%	1/10W
1-216-035-00	s	CHIP	270	5%	1/10W
1-216-037-00	s	CHIP	330	5%	1/10W
1-216-039-00	s	CHIP	390	5%	1/10W
1-216-041-00	s	CHIP	470	5%	1/10W
1-216-043-00	s	CHIP	560	5%	1/10W
1-216-045-00	s	CHIP	680	5%	1/10W
1-216-047-00	s	CHIP	820	5%	1/10W
1-216-049-00	s	CHIP	1k	5%	1/10W
1-216-051-00	s	CHIP	1.2k	5%	1/10W
1-216-053-00	s	CHIP	1.5k	5%	1/10W
1-216-055-00	s	CHIP	1.8k	5%	1/10W
1-216-057-00	s	CHIP	2.2k	5%	1/10W
1-216-059-00	s	CHIP	2.7k	5%	1/10W
1-216-061-00	s	CHIP	3.3k	5%	1/10W
1-216-063-00	s	CHIP	3.9k	5%	1/10W
1-216-065-00	s	CHIP	4.7k	5%	1/10W
1-216-067-00	s	CHIP	5.6k	5%	1/10W
1-216-069-00	s	CHIP	6.8k	5%	1/10W
1-216-071-00	s	CHIP	8.2k	5%	1/10W
1-216-073-00	s	CHIP	10k	5%	1/10W
1-216-075-00	s	CHIP	12k	5%	1/10W
1-216-077-00	s	CHIP	15k	5%	1/10W
1-216-079-00	s	CHIP	18k	5%	1/10W
1-216-081-00	s	CHIP	22k	5%	1/10W
1-216-083-00	s	CHIP	27k	5%	1/10W
1-216-085-00	s	CHIP	33k	5%	1/10W
1-216-087-00	s	CHIP	39k	5%	1/10W
1-216-089-00	s	CHIP	47k	5%	1/10W
1-216-091-00	s	CHIP	56k	5%	1/10W
1-216-093-00	s	CHIP	68k	5%	1/10W
1-216-095-00	s	CHIP	82k	5%	1/10W
1-216-097-00	s	CHIP	100k	5%	1/10W
1-216-099-00	s	CHIP	120k	5%	1/10W
1-216-101-00	s	CHIP	150k	5%	1/10W

(RESISTOR, CHIP)

Part No. SP Description

1-216-103-00	s	CHIP	180k	5%	1/10W
1-216-105-00	s	CHIP	220k	5%	1/10W
1-216-107-00	s	CHIP	270k	5%	1/10W
1-216-109-00	s	CHIP	330k	5%	1/10W
1-216-111-00	s	CHIP	390k	5%	1/10W
1-216-113-00	s	CHIP	470k	5%	1/10W
1-216-115-00	s	CHIP	560k	5%	1/10W
1-216-117-00	s	CHIP	680k	5%	1/10W
1-216-119-00	s	CHIP	820k	5%	1/10W
1-216-121-00	s	CHIP	1.0M	5%	1/10W
1-216-123-00	s	CHIP	1.2M	5%	1/10W
1-216-125-00	s	CHIP	1.5M	5%	1/10W
1-216-127-00	s	CHIP	1.8M	5%	1/10W
1-216-129-00	s	CHIP	2.2M	5%	1/10W
1-216-131-00	s	CHIP	2.7M	5%	1/10W
1-216-133-00	s	CHIP	3.3M	5%	1/10W

CAPACITOR, CHIP CERAMIC

Part No. SP Description

1-163-083-00	s	CHIP CERAMIC	1pF	+-0.25pF	50V
1-163-085-00	s	CHIP CERAMIC	2pF	+-0.25pF	50V
1-163-087-00	s	CHIP CERAMIC	4pF	+-0.25pF	50V
1-163-089-00	s	CHIP CERAMIC	6pF	+-0.5pF	50V
1-163-091-00	s	CHIP CERAMIC	8pF	+-0.5pF	50V
1-163-093-00	s	CHIP CERAMIC	10pF	5%	50V
1-163-097-00	s	CHIP CERAMIC	15pF	5%	50V
1-163-101-00	s	CHIP CERAMIC	22pF	5%	50V
1-163-105-00	s	CHIP CERAMIC	33pF	5%	50V
1-163-109-00	s	CHIP CERAMIC	47pF	5%	50V
1-163-113-00	s	CHIP CERAMIC	68pF	5%	50V
1-163-117-00	s	CHIP CERAMIC	100pF	5%	50V
1-163-121-00	s	CHIP CERAMIC	150pF	5%	50V
1-163-125-00	s	CHIP CERAMIC	220pF	5%	50V
1-163-129-00	s	CHIP CERAMIC	330pF	5%	50V
1-163-133-00	s	CHIP CERAMIC	470pF	5%	50V
1-163-137-00	s	CHIP CERAMIC	680pF	5%	50V
1-163-141-00	s	CHIP CERAMIC	1000pF	5%	50V
1-163-145-00	s	CHIP CERAMIC	1500pF	10%	50V
1-163-013-00	s	CHIP CERAMIC	2200pF	10%	50V
1-163-015-00	s	CHIP CERAMIC	3300pF	10%	50V
1-163-017-00	s	CHIP CERAMIC	4700pF	10%	50V
1-163-019-00	s	CHIP CERAMIC	6800pF	10%	50V
1-163-021-00	s	CHIP CERAMIC	0.01	10%	50V
1-163-023-00	s	CHIP CERAMIC	0.015	10%	50V
1-163-034-00	s	CHIP CERAMIC	0.033		50V
1-163-035-00	s	CHIP CERAMIC	0.047		50V
1-163-036-00	s	CHIP CERAMIC	0.068		50V
1-163-038-00	s	CHIP CERAMIC	0.1		50V

CAPACITOR, ELECTROLYTIC

Part No. SP Description

1-124-463-11	s	ELECT	0.1	20%	50V
1-124-464-11	s	ELECT	0.22	20%	50V
1-124-252-11	s	ELECT	0.33	20%	50V
1-124-465-21	s	ELECT	0.47	20%	50V
1-124-438-11	s	ELECT	1.0	20%	50V
1-124-257-11	s	ELECT	2.2	20%	50V
1-124-258-11	s	ELECT	3.3	20%	50V
1-124-245-11	s	ELECT	4.7	20%	35V
1-124-259-11	s	ELECT	4.7	20%	50V
1-124-462-11	s	ELECT	10	20%	16V
1-124-247-11	s	ELECT	10	20%	35V
1-124-261-11	s	ELECT	10	20%	50V
1-124-222-11	s	ELECT	22	20%	6.3V
1-124-234-11	s	ELECT	22	20%	16V
1-124-248-11	s	ELECT	22	20%	35V
1-124-431-11	s	ELECT	33	20%	4V
1-124-229-11	s	ELECT	33	20%	10V
1-124-242-11	s	ELECT	33	20%	25V
1-124-224-11	s	ELECT	47	20%	6.3V
1-124-236-11	s	ELECT	47	20%	16V
1-124-584-11	s	ELECT	100	20%	10V

CN-198 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-627-173-11	o PRINTED CIRCUIT BOARD, CN-198
1pc	1-942-041-11	o HARNESS (SG202)
CN3	1-565-301-11	s CONNECTOR, ROUD TYPE 4P "Y/C OUT"
CN4	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "R/R-Y"
CN5	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "R1"
CN6	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "G/Y"
CN7	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "G1"
CN8	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "B/B-Y"
CN9	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "B1"
CN10	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VBS1"
CN11	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VBS-2"
S1	1-516-779-11	s SLIDE SWITCH "GAMMA"
S2	1-516-779-11	s SLIDE SWITCH "RBG SYNC"
S3	1-516-779-11	s SLIDE SWITCH "LINEAR MATRIX"
S4	1-516-779-11	s SLIDE SWITCH "RGB2/COMPONENT"

CN-199 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-627-174-11	o PRINTED CIRCUIT BOARD, CN-199
1pc	1-942-040-11	o HARNESS (SG104)
C1	1-101-884-00	s CERAMIC 56PF 5% 50V
CN2	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "COMPOSITE SYNC"
CN3	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "HD" (OUTPUT)
CN4	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VBS"
CN5	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VBS"
CN6	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "CLOCK"
CN7	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VD" (OUTPUT)
CN8	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "HD" (GENLOCK IN)
CN9	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "HD" (GENLOCK IN)
CN10	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "AUX IN"
CN11	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VD" (GENLOCK IN)
CN12	1-562-261-51	s CONNECTOR, COAXIAL (BNC) "VD" (GENLOCK IN)
FB1	1-543-236-11	o BEAD, FERRITE
R1	1-214-530-00	s METAL 75 1% 1/8W
R2	1-214-530-00	s METAL 75 1% 1/8W
R3	1-214-530-00	s METAL 75 1% 1/8W
R4	1-214-530-00	s METAL 75 1% 1/8W
S1	1-554-643-00	s SWITCH, SLIDE "VBS 75Ω"
S2	1-554-643-00	s SWITCH, SLIDE "VD 75Ω"
S3	1-554-643-00	s SWITCH, SLIDE "HD 75Ω"

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

CN-218A BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-942-031-11	o HARNESS (PR6)
1pc	1-942-039-11	o HARNESS (SG101)
C1	1-163-251-11	s CERAMIC 100PF 5% 50V
C2	1-163-251-11	s CERAMIC 100PF 5% 50V
C3	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C4	1-163-251-11	s CERAMIC 100PF 5% 50V
C5	1-163-251-11	s CERAMIC 100PF 5% 50V
C6	1-163-251-11	s CERAMIC 100PF 5% 50V
C7	1-163-251-11	s CERAMIC 100PF 5% 50V
C8	1-163-251-11	s CERAMIC 100PF 5% 50V
CN3	1-561-336-00	s CONNECTOR, COAXIAL
CN4	1-565-653-11	s CONNECTOR, SMALL TYPE (8P)
CN5	1-563-929-11	s CONNECTOR, ROUND TYPE (RF) 4P
FB1	1-543-469-11	s BEAD, FERRITE (CHIP)
FB2	1-543-469-11	s BEAD, FERRITE (CHIP)
L1	1-408-767-21	s INDUCTOR CHIP 1.5uH

CN-315A BOARD

Ref. No. or Q'ty	Part No.	SP Description
C7	1-163-251-11	s CERAMIC 100PF 5% 50V
C8	1-163-251-11	s CERAMIC 100PF 5% 50V
CN1	1-562-222-21	s CONNECTOR, 6P "LENS"
CN2	1-563-929-11	s CONNECTOR, 4P FEMALE "CONTROL IN"
FB1	1-543-309-21	s BEAD, FERRITE
FB2	1-543-309-21	s BEAD, FERRITE
L1	1-408-767-21	s INDUCTOR CHIP 1.5uH
L2	1-408-767-21	s INDUCTOR CHIP 1.5uH

CT-90 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-627-161-11	o PRINTED CIRCUIT BOARD, CT-90
1pc	1-942-032-11	o HARNESS (PRI02)
1pc	1-942-037-11	o HARNESS (PRI03)
1pc	1-942-038-11	o HARNESS (SG102)
CN1	1-506-490-21	s PIN, CONNECTOR 11P
R1	1-249-413-11	s CARBON 470 5% 1/4W
R2	1-249-413-11	s CARBON 470 5% 1/4W
R3	1-249-413-11	s CARBON 470 5% 1/4W
R4	1-249-413-11	s CARBON 470 5% 1/4W
R5	1-249-413-11	s CARBON 470 5% 1/4W
R6	1-249-413-11	s CARBON 470 5% 1/4W
R7	1-249-413-11	s CARBON 470 5% 1/4W
R8	1-249-413-11	s CARBON 470 5% 1/4W
R9	1-249-413-11	s CARBON 470 5% 1/4W
R10	1-249-413-11	s CARBON 470 5% 1/4W
R11	1-249-413-11	s CARBON 470 5% 1/4W
RV1	1-238-258-11	s RES, VAR, CARBON 50K
RV2	1-238-258-11	s RES, VAR, CARBON 50K
RV3	1-238-258-11	s RES, VAR, CARBON 50K
RV4	1-238-258-11	s RES, VAR, CARBON 50K
RV5	1-238-258-11	s RES, VAR, CARBON 50K
RV6	1-238-257-11	s RES, VAR, CARBON 50K
RV7	1-241-512-11	s RES, VAR, CARBON 10K
RV8	1-238-255-21	s RES, VAR, CARBON 10K
RV9	1-238-255-21	s RES, VAR, CARBON 10K
S1	1-516-961-00	s SWITCH, LEVER SLIDE "COLOR TEMP"
S2	1-516-961-00	s SWITCH, LEVER SLIDE "W/B BALANCE"
S3	1-516-961-00	s SWITCH, LEVER SLIDE "IRIS"
S4	1-516-961-00	s SWITCH, LEVER SLIDE "MODE"
S5	1-516-961-00	s SWITCH, LEVER SLIDE "SUTTER"
S7	1-516-637-00	s SWITCH, SLIDE "PHASE"

CT-91 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-627-162-11	o PRINTED CIRCUIT BOARD, CT-91
S1	1-571-623-11	s SWITCH, ROTARY "SHUTTER"

CT-113 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-627-160-11	o PRINTED CIRCUIT BOARD, CT-113
S1	1-570-817-21	s SWITCH, ROTARY "GAIN"

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

DR-61 BOARD

Ref. No.
or Q'ty Part No. SP Description

C1	1-163-251-11	s CERAMIC 100PF 5% 50V
C2	1-163-251-11	s CERAMIC 100PF 5% 50V
C4	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C5	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C7	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C8	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C10	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C11	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
D1	8-719-104-34	s DIODE 1S2836
D2	8-719-104-34	s DIODE 1S2836
D3	8-719-104-34	s DIODE 1S2836
IC1	8-759-013-02	s IC CXB0026AM
IC2	8-759-013-02	s IC CXB0026AM
IC3	8-759-013-02	s IC CXB0026AM

DR-62 BOARD

Ref. No.
or Q'ty Part No. SP Description

C1	1-135-159-21	s TANTALUM, CHIP 10uF 10% 20V
C2	1-135-159-21	s TANTALUM, CHIP 10uF 10% 20V
C3	1-135-079-21	s TANTAL 3.3uF 20% 25V
C4	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C5	1-135-164-21	s TANTAL 22uF 20% 10V
C6	1-135-159-21	s TANTALUM, CHIP 10uF 10% 20V
C8	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C10	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C11	1-164-005-11	s CERAMIC, CHIP 0.47uF 25V
C12	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C13	1-135-159-21	s TANTALUM, CHIP 10uF 10% 20V
C14	1-135-145-11	s TANTALUM, CHIP 0.47uF 10% 35V
C15	1-135-145-11	s TANTALUM, CHIP 0.47uF 10% 35V
C16	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C17	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C18	1-135-145-11	s TANTALUM, CHIP 0.47uF 10% 35V
C19	1-135-076-21	s TANTALUM, CHIP 1uF 10% 35V
C20	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C21	1-135-164-21	s TANTAL 22uF 20% 10V
C22	1-135-159-21	s TANTALUM, CHIP 10uF 10% 20V
C25	1-163-235-11	s CERAMIC 22PF 5% 50V
C26	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C27	1-135-079-21	s TANTAL 3.3uF 20% 25V
C28	1-135-152-21	s TANTAL 1.5uF 10% 25V
C29	1-135-079-21	s TANTAL 3.3uF 20% 25V
C30	1-135-152-21	s TANTAL 1.5uF 10% 25V
C31	1-135-079-21	s TANTAL 3.3uF 20% 25V
C32	1-135-152-21	s TANTAL 1.5uF 10% 25V
C33	1-135-079-21	s TANTAL 3.3uF 20% 25V
C34	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C35	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C36	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C37	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C40	1-163-227-11	s CERAMIC 10PF 5% 50V
C42	1-163-227-11	s CERAMIC 10PF 5% 50V
C44	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C46	1-163-227-11	s CERAMIC 10PF 5% 50V
C48	1-135-165-11	s TANTAL 33uF 10% 16V
C49	1-135-165-11	s TANTAL 33uF 10% 16V
C50	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C51	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C52	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C53	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
CN2	1-506-483-21	o CONNECTOR, 4P, MALE
D2	8-719-104-34	s DIODE 1S2836
D3	8-719-104-34	s DIODE 1S2836
D4	8-719-104-34	s DIODE 1S2836
D5	8-719-800-76	s DIODE 1SS226
D6	8-719-104-34	s DIODE 1S2836
D7	8-719-104-34	s DIODE 1S2836
D8	8-719-104-34	s DIODE 1S2836
D9	8-719-104-34	s DIODE 1S2836
D10	8-719-104-34	s DIODE 1S2836
D11	8-719-104-34	s DIODE 1S2836
D12	8-719-104-34	s DIODE 1S2836
D13	8-719-104-34	s DIODE 1S2836
D14	8-719-800-76	s DIODE 1SS226

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(DR-62 BOARD)

Ref. No. or Q'ty	Part No.	SP Description
D15	8-719-800-76 s	DIODE 1SS226
D16	8-719-104-34 s	DIODE 1S2836
D17	8-719-104-34 s	DIODE 1S2836
D18	8-719-800-76 s	DIODE 1SS226
D19	8-719-400-18 s	DIODE MA152WK
D20	8-719-400-18 s	DIODE MA152WK
D21	8-719-400-18 s	DIODE MA152WK
D22	8-719-400-18 s	DIODE MA152WK
D23	8-719-104-34 s	DIODE 1S2836
IC1	8-752-031-03 s	IC CXA1065M
IC2	8-752-031-03 s	IC CXA1065M
Q1	8-729-100-66 s	TRANSISTOR 2SC1623
Q2	8-729-100-66 s	TRANSISTOR 2SC1623
Q4	8-729-112-65 s	TRANSISTOR 2SA1462-Y33
Q5	8-729-112-65 s	TRANSISTOR 2SA1462-Y33
Q7	8-729-100-66 s	TRANSISTOR 2SC1623
Q8	8-729-100-66 s	TRANSISTOR 2SC1623
Q10	8-729-100-66 s	TRANSISTOR 2SC1623
Q11	8-729-100-66 s	TRANSISTOR 2SC1623
Q13	8-729-100-66 s	TRANSISTOR 2SC1623
Q14	8-729-100-66 s	TRANSISTOR 2SC1623
Q19	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q20	8-729-122-63 s	TRANSISTOR 2SA1226
Q21	8-729-122-63 s	TRANSISTOR 2SA1226
Q22	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q23	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q24	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q25	8-729-122-63 s	TRANSISTOR 2SA1226
Q26	8-729-122-63 s	TRANSISTOR 2SA1226
Q27	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q28	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q29	8-729-216-22 s	TRANSISTOR 2SA1162
Q30	8-729-216-22 s	TRANSISTOR 2SA1162
Q31	8-729-100-66 s	TRANSISTOR 2SC1623
Q32	8-729-100-66 s	TRANSISTOR 2SC1623
Q33	8-729-122-63 s	TRANSISTOR 2SA1226
Q34	8-729-122-63 s	TRANSISTOR 2SA1226
Q35	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q36	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q37	8-729-175-72 s	TRANSISTOR 2SC2757-T33
R70	1-216-673-11 s	METAL, CHIP 8.2K 0.5% 1/10W
R71	1-216-669-11 s	METAL, CHIP 5.6K 0.5% 1/10W
R72	1-216-673-11 s	METAL, CHIP 8.2K 0.5% 1/10W
RV1	1-228-462-00 s	RES, ADJ, METAL 100K
RV2	1-228-462-00 s	RES, ADJ, METAL 100K
RV3	1-228-462-00 s	RES, ADJ, METAL 100K

PA-64 BOARD

Ref. No. or Q'ty	Part No.	SP Description
C1	1-135-092-21 s	TANTALUM, CHIP 3.3uF 10% 16V
C2	1-135-089-21 s	TANTALUM, CHIP 6.8uF 10% 20V
C8	1-135-085-21 s	TANTALUM, CHIP 4.7uF 10% 25V
C9	1-163-263-11 s	CERAMIC 330PF 5% 50V
C10	1-135-155-21 s	TANTAL CHIP 4.7uF 10% 16V
C11	1-135-165-11 s	TANTAL 33uF 10% 16V
C12	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C14	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C17	1-163-235-11 s	CERAMIC 22PF 5% 50V
C18	1-163-235-11 s	CERAMIC 22PF 5% 50V
C20	1-163-235-11 s	CERAMIC 22PF 5% 50V
C21	1-135-156-21 s	TANTAL 6.8uF 10% 6.3V
C23	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C24	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C25	1-135-162-21 s	TANTAL 33uF 10% 6.3V
Q1	8-729-100-66 s	TRANSISTOR 2SC1623
Q2	8-729-122-63 s	TRANSISTOR 2SA1226
Q3	8-769-401-67 s	TRANSISTOR 3SK163-1
Q4	8-729-100-66 s	TRANSISTOR 2SC1623
Q5	8-729-122-63 s	TRANSISTOR 2SA1226
Q6	8-769-401-67 s	TRANSISTOR 3SK163-1
Q7	8-729-100-66 s	TRANSISTOR 2SC1623
Q8	8-729-122-63 s	TRANSISTOR 2SA1226
Q9	8-769-401-67 s	TRANSISTOR 3SK163-1
Q10	8-729-100-66 s	TRANSISTOR 2SC1623
Q11	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q12	8-729-100-66 s	TRANSISTOR 2SC1623
Q13	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q14	8-729-100-66 s	TRANSISTOR 2SC1623
Q15	8-729-100-66 s	TRANSISTOR 2SC1623
Q16	8-729-100-66 s	TRANSISTOR 2SC1623
R6	1-216-748-11 s	METAL, CHIP 39K 1% 1/10W

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

PA-65 BOARD

Ref. No.
or Q'ty Part No. SP Description

C1	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C2	1-135-089-21	s TANTALUM, CHIP 6.8uF 10% 20V
C9	1-163-263-11	s CERAMIC 330PF 5% 50V
C10	1-135-085-21	s TANTALUM, CHIP 4.7uF 10% 25V
C11	1-135-155-21	s TANTAL CHIP 4.7uF 10% 16V
C12	1-135-165-11	s TANTAL 33uF 10% 16V
C13	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C15	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C18	1-163-235-11	s CERAMIC 22PF 5% 50V
C19	1-163-235-11	s CERAMIC 22PF 5% 50V
C21	1-163-235-11	s CERAMIC 22PF 5% 50V
C22	1-163-235-11	s CERAMIC 22PF 5% 50V
C23	1-163-235-11	s CERAMIC 22PF 5% 50V
C24	1-135-156-21	s TANTAL 6.8uF 10% 6.3V
C25	1-164-161-11	s CERAMIC, CHIP 0.0022uF 10% 100V
C26	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C27	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C28	1-135-162-21	s TANTAL 33uF 10% 6.3V
Q1	8-729-100-66	s TRANSISTOR 2SC1623
Q2	8-729-216-22	s TRANSISTOR 2SA1162
Q3	8-769-401-67	s TRANSISTOR 3SK163-1
Q4	8-729-100-66	s TRANSISTOR 2SC1623
Q5	8-729-216-22	s TRANSISTOR 2SA1162
Q6	8-769-401-67	s TRANSISTOR 3SK163-1
Q7	8-729-100-66	s TRANSISTOR 2SC1623
Q8	8-729-216-22	s TRANSISTOR 2SA1162
Q9	8-769-401-67	s TRANSISTOR 3SK163-1
Q10	8-729-100-66	s TRANSISTOR 2SC1623
Q11	8-729-216-22	s TRANSISTOR 2SA1162
Q12	8-769-401-67	s TRANSISTOR 3SK163-1
Q13	8-729-100-66	s TRANSISTOR 2SC1623
Q14	8-729-216-22	s TRANSISTOR 2SA1162
Q15	8-769-401-67	s TRANSISTOR 3SK163-1
Q16	8-729-100-66	s TRANSISTOR 2SC1623
Q17	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q18	8-729-100-66	s TRANSISTOR 2SC1623
Q19	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q20	8-729-100-66	s TRANSISTOR 2SC1623
Q21	8-729-100-66	s TRANSISTOR 2SC1623
Q22	8-729-100-66	s TRANSISTOR 2SC1623
R6	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R35	1-216-680-11	s METAL, CHIP 16K 0.5% 1/10W
R36	1-216-665-11	s METAL, CHIP 3.9K 0.5% 1/10W

PA-66 BOARD

Ref. No.
or Q'ty Part No. SP Description

C1	1-135-092-21	s TANTALUM, CHIP 3.3uF 10% 16V
C2	1-135-089-21	s TANTALUM, CHIP 6.8uF 10% 20V
C8	1-135-085-21	s TANTALUM, CHIP 4.7uF 10% 25V
C9	1-163-263-11	s CERAMIC 330PF 5% 50V
C10	1-135-155-21	s TANTAL CHIP 4.7uF 10% 16V
C11	1-135-165-11	s TANTAL 33uF 10% 16V
C12	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C14	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C17	1-163-235-11	s CERAMIC 22PF 5% 50V
C18	1-163-235-11	s CERAMIC 22PF 5% 50V
C20	1-163-235-11	s CERAMIC 22PF 5% 50V
C21	1-135-156-21	s TANTAL 6.8uF 10% 6.3V
C22	1-164-161-11	s CERAMIC, CHIP 0.0022uF 10% 100V
C23	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C24	1-135-161-21	s TANTALUM, CHIP 22uF 10% 10V
C25	1-135-162-21	s TANTAL 33uF 10% 6.3V
Q1	8-729-100-66	s TRANSISTOR 2SC1623
Q2	8-729-122-63	s TRANSISTOR 2SA1226
Q3	8-769-401-67	s TRANSISTOR 3SK163-1
Q4	8-729-100-66	s TRANSISTOR 2SC1623
Q5	8-729-122-63	s TRANSISTOR 2SA1226
Q6	8-769-401-67	s TRANSISTOR 3SK163-1
Q7	8-729-100-66	s TRANSISTOR 2SC1623
Q8	8-729-122-63	s TRANSISTOR 2SA1226
Q9	8-769-401-67	s TRANSISTOR 3SK163-1
Q10	8-729-100-66	s TRANSISTOR 2SC1623
Q11	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q12	8-729-100-66	s TRANSISTOR 2SC1623
Q13	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q14	8-729-100-66	s TRANSISTOR 2SC1623
Q15	8-729-100-66	s TRANSISTOR 2SC1623
Q16	8-729-100-66	s TRANSISTOR 2SC1623
R6	1-216-748-11	s METAL, CHIP 39K 1% 1/10W

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

PR-162P BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-7515-332-A	o MOUNTED CIRCUIT BOARD, PR-162P
1pc	7-682-947-01	s SCREW +PSW 3X6
C2	1-163-037-11	s CERAMIC, CHIP 0.022uF 10% 25V
C3	1-124-234-00	s ELECT 22uF 20% 16V
C4	1-124-621-11	s ELECT 3300uF 20% 6.3V
C6	1-124-229-00	s ELECT 33uF 20% 10V
C7	1-124-229-00	s ELECT 33uF 20% 10V
C9	1-124-229-00	s ELECT 33uF 20% 10V
C11	1-126-176-11	s ELECT 220uF 20% 10V
C12	1-124-473-11	s ELECT 1000uF 20% 10V
C13	1-124-229-00	s ELECT 33uF 20% 10V
C14	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C15	1-163-119-00	s CERAMIC, CHIP 120PF 5% 50V
C17	1-124-589-11	s ELECT 47uF 20% 16V
C18	1-163-235-11	s CERAMIC 22PF 5% 50V
C19	1-163-095-00	s CERAMIC, CHIP 12PF 5% 50V
C22	1-163-120-00	s CERAMIC, CHIP 130PF 5% 50V
C23	1-163-100-00	s CERAMIC, CHIP 20PF 5% 50V
C24	1-163-104-00	s CERAMIC, CHIP 30PF 5% 50V
C25	1-163-227-11	s CERAMIC 10PF 5% 50V
C26	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C27	1-163-112-00	s CERAMIC, CHIP 62PF 5% 50V
C28	1-124-257-00	s ELECT 2.2uF 20% 50V
C29	1-124-257-00	s ELECT 2.2uF 20% 50V
C31	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C33	1-124-234-00	s ELECT 22uF 20% 16V
C34	1-124-229-00	s ELECT 33uF 20% 10V
C35	1-124-229-00	s ELECT 33uF 20% 10V
C36	1-124-229-00	s ELECT 33uF 20% 10V
C37	1-126-157-11	s ELECT 10uF 20% 16V
C38	1-126-157-11	s ELECT 10uF 20% 16V
C39	1-124-229-00	s ELECT 33uF 20% 10V
C40	1-124-229-00	s ELECT 33uF 20% 10V
C43	1-163-037-11	s CERAMIC, CHIP 0.022uF 10% 25V
C44	1-124-234-00	s ELECT 22uF 20% 16V
C45	1-124-621-11	s ELECT 3300uF 20% 6.3V
C47	1-124-229-00	s ELECT 33uF 20% 10V
C48	1-124-229-00	s ELECT 33uF 20% 10V
C49	1-124-229-00	s ELECT 33uF 20% 10V
C52	1-126-176-11	s ELECT 220uF 20% 10V
C53	1-124-473-11	s ELECT 1000uF 20% 10V
C54	1-124-229-00	s ELECT 33uF 20% 10V
C55	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C56	1-163-119-00	s CERAMIC, CHIP 120PF 5% 50V
C58	1-124-589-11	s ELECT 47uF 20% 16V
C59	1-163-235-11	s CERAMIC 22PF 5% 50V
C60	1-163-095-00	s CERAMIC, CHIP 12PF 5% 50V
C62	1-163-100-00	s CERAMIC, CHIP 20PF 5% 50V
C63	1-163-104-00	s CERAMIC, CHIP 30PF 5% 50V
C64	1-163-227-11	s CERAMIC 10PF 5% 50V
C66	1-163-120-00	s CERAMIC, CHIP 130PF 5% 50V
C67	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C69	1-163-112-00	s CERAMIC, CHIP 62PF 5% 50V
C70	1-124-257-00	s ELECT 2.2uF 20% 50V
C71	1-124-257-00	s ELECT 2.2uF 20% 50V
C75	1-124-229-00	s ELECT 33uF 20% 10V
C76	1-163-235-11	s CERAMIC 22PF 5% 50V
C78	1-124-229-00	s ELECT 33uF 20% 10V

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C79	1-124-229-00	s ELECT 33uF 20% 10V
C80	1-124-229-00	s ELECT 33uF 20% 10V
C81	1-126-154-11	s ELECT 47uF 20% 6.3V
C82	1-126-157-11	s ELECT 10uF 20% 16V
C83	1-124-229-00	s ELECT 33uF 20% 10V
C84	1-124-229-00	s ELECT 33uF 20% 10V
C86	1-163-037-11	s CERAMIC, CHIP 0.022uF 10% 25V
C87	1-124-234-00	s ELECT 22uF 20% 16V
C88	1-124-621-11	s ELECT 3300uF 20% 6.3V
C90	1-124-229-00	s ELECT 33uF 20% 10V
C91	1-124-229-00	s ELECT 33uF 20% 10V
C92	1-126-176-11	s ELECT 220uF 20% 10V
C93	1-124-229-00	s ELECT 33uF 20% 10V
C96	1-126-163-11	s ELECT 4.7MF 20% 50V
C97	1-124-473-11	s ELECT 1000uF 20% 10V
C98	1-124-229-00	s ELECT 33uF 20% 10V
C99	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C100	1-163-119-00	s CERAMIC, CHIP 120PF 5% 50V
C102	1-124-589-11	s ELECT 47uF 20% 16V
C103	1-163-235-11	s CERAMIC 22PF 5% 50V
C104	1-163-095-00	s CERAMIC, CHIP 12PF 5% 50V
C106	1-163-120-00	s CERAMIC, CHIP 130PF 5% 50V
C108	1-163-227-11	s CERAMIC 10PF 5% 50V
C109	1-163-100-00	s CERAMIC, CHIP 20PF 5% 50V
C110	1-163-104-00	s CERAMIC, CHIP 30PF 5% 50V
C111	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C112	1-163-112-00	s CERAMIC, CHIP 62PF 5% 50V
C114	1-124-257-00	s ELECT 2.2uF 20% 50V
C115	1-124-257-00	s ELECT 2.2uF 20% 50V
C116	1-163-103-00	s CERAMIC, CHIP 27PF 5% 50V
C117	1-124-234-00	s ELECT 22uF 20% 16V
C118	1-126-153-11	s ELECT 22uF 20% 6.3V
C119	1-124-229-00	s ELECT 33uF 20% 10V
C120	1-124-229-00	s ELECT 33uF 20% 10V
C121	1-124-229-00	s ELECT 33uF 20% 10V
C122	1-124-229-00	s ELECT 33uF 20% 10V
C123	1-124-229-00	s ELECT 33uF 20% 10V
C124	1-124-229-00	s ELECT 33uF 20% 10V
C125	1-124-229-00	s ELECT 33uF 20% 10V
C126	1-124-229-00	s ELECT 33uF 20% 10V
C127	1-124-229-00	s ELECT 33uF 20% 10V
C128	1-124-229-00	s ELECT 33uF 20% 10V
C129	1-124-229-00	s ELECT 33uF 20% 10V
C130	1-124-229-00	s ELECT 33uF 20% 10V
C131	1-124-229-00	s ELECT 33uF 20% 10V
C132	1-124-229-00	s ELECT 33uF 20% 10V
C133	1-126-157-11	s ELECT 10uF 20% 16V
C134	1-124-229-00	s ELECT 33uF 20% 10V
C135	1-124-229-00	s ELECT 33uF 20% 10V
C136	1-124-229-00	s ELECT 33uF 20% 10V
C137	1-124-229-00	s ELECT 33uF 20% 10V
C138	1-124-229-00	s ELECT 33uF 20% 10V
C139	1-124-229-00	s ELECT 33uF 20% 10V
C140	1-163-251-11	s CERAMIC 100PF 5% 50V
C141	1-163-251-11	s CERAMIC 100PF 5% 50V
C142	1-163-251-11	s CERAMIC 100PF 5% 50V
C146	1-124-472-11	s ELECT 470uF 20% 10V
C154	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C155	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

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Ref. No. or Q'ty	Part No.	SP Description
C156	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C159	1-163-251-11	s CERAMIC 100PF 5% 50V
C160	1-163-251-11	s CERAMIC 100PF 5% 50V
C161	1-131-377-00	s TANTALUM 10uF 10% 10V
C162	1-131-377-00	s TANTALUM 10uF 10% 10V
C163	1-131-377-00	s TANTALUM 10uF 10% 10V
C164	1-163-251-11	s CERAMIC 100PF 5% 50V
C165	1-163-251-11	s CERAMIC 100PF 5% 50V
C166	1-163-251-11	s CERAMIC 100PF 5% 50V
C201	1-124-229-00	s ELECT 33uF 20% 10V
C202	1-124-229-00	s ELECT 33uF 20% 10V
C203	1-126-154-11	s ELECT 47uF 20% 6.3V
C204	1-124-229-00	s ELECT 33uF 20% 10V
C205	1-126-154-11	s ELECT 47uF 20% 6.3V
C206	1-126-157-11	s ELECT 10uF 20% 16V
C207	1-131-341-00	s TANTALUM 0.1uF 10% 35V
C208	1-163-251-11	s CERAMIC 100PF 5% 50V
C209	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C210	1-124-234-00	s ELECT 22uF 20% 16V
C212	1-126-153-11	s ELECT 22uF 20% 6.3V
C213	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C214	1-124-589-11	s ELECT 47uF 20% 16V
C215	1-124-277-11	s ELECT 4.7uF 20% 35V
C216	1-124-584-00	s ELECT 100uF 20% 10V
C218	1-126-157-11	s ELECT 10uF 20% 16V
C219	1-124-234-00	s ELECT 22uF 20% 16V
C220	1-126-153-11	s ELECT 22uF 20% 6.3V
C221	1-126-153-11	s ELECT 22uF 20% 6.3V
C223	1-124-234-00	s ELECT 22uF 20% 16V
C224	1-126-153-11	s ELECT 22uF 20% 6.3V
C225	1-126-163-11	s ELECT 4.7MF 20% 50V
C226	1-124-477-11	s ELECT 47uF 20% 25V
C227	1-126-163-11	s ELECT 4.7MF 20% 50V
C228	1-126-163-11	s ELECT 4.7MF 20% 50V
C230	1-124-234-00	s ELECT 22uF 20% 16V
C231	1-130-495-00	s MYLAR 0.1uF 5% 50V
C232	1-126-153-11	s ELECT 22uF 20% 6.3V
C233	1-124-903-11	s ELECT 1uF 20% 50V
C235	1-124-903-11	s ELECT 1uF 20% 50V
C239	1-126-162-11	s ELECT 3.3uF 20% 50V
C240	1-126-153-11	s ELECT 22uF 20% 6.3V
C241	1-124-234-00	s ELECT 22uF 20% 16V
C249	1-126-153-11	s ELECT 22uF 20% 6.3V
C255	1-126-153-11	s ELECT 22uF 20% 6.3V
C256	1-163-235-11	s CERAMIC 22PF 5% 50V
C257	1-124-234-00	s ELECT 22uF 20% 16V
C259	1-163-263-11	s CERAMIC 330PF 5% 50V
C261	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C262	1-126-162-11	s ELECT 3.3uF 20% 50V
C263	1-131-347-00	s TANTALUM 1uF 10% 35V
C264	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C265	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C266	1-124-234-00	s ELECT 22uF 20% 16V
C268	1-124-234-00	s ELECT 22uF 20% 16V
C269	1-126-163-11	s ELECT 4.7MF 20% 50V
C270	1-130-475-00	s MYLAR 0.0022uF 5% 50V
C271	1-125-444-11	s DOUBLE LAYERS 0.1F 5.5V
C272	1-126-153-11	s ELECT 22uF 20% 6.3V
C273	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V

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Ref. No. or Q'ty	Part No.	SP Description
C274	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C301	1-163-088-00	s CERAMIC, CHIP 5PF 50V
C302	1-124-234-00	s ELECT 22uF 20% 16V
C303	1-124-229-00	s ELECT 33uF 20% 10V
C304	1-124-229-00	s ELECT 33uF 20% 10V
C305	1-163-088-00	s CERAMIC, CHIP 5PF 50V
C306	1-124-234-00	s ELECT 22uF 20% 16V
C307	1-124-229-00	s ELECT 33uF 20% 10V
C308	1-124-229-00	s ELECT 33uF 20% 10V
C309	1-163-088-00	s CERAMIC, CHIP 5PF 50V
C310	1-124-234-00	s ELECT 22uF 20% 16V
C311	1-124-229-00	s ELECT 33uF 20% 10V
C313	1-124-234-00	s ELECT 22uF 20% 16V
C314	1-126-153-11	s ELECT 22uF 20% 6.3V
C315	1-124-234-00	s ELECT 22uF 20% 16V
C316	1-124-234-00	s ELECT 22uF 20% 16V
C317	1-126-153-11	s ELECT 22uF 20% 6.3V
C318	1-124-234-00	s ELECT 22uF 20% 16V
C320	1-124-234-00	s ELECT 22uF 20% 16V
C322	1-124-234-00	s ELECT 22uF 20% 16V
C324	1-124-234-00	s ELECT 22uF 20% 16V
C325	1-124-584-00	s ELECT 100uF 20% 10V
C326	1-126-154-11	s ELECT 47uF 20% 6.3V
C327	1-124-229-00	s ELECT 33uF 20% 10V
C328	1-126-154-11	s ELECT 47uF 20% 6.3V
C329	1-124-229-00	s ELECT 33uF 20% 10V
C330	1-126-154-11	s ELECT 47uF 20% 6.3V
C331	1-124-229-00	s ELECT 33uF 20% 10V
C332	1-124-229-00	s ELECT 33uF 20% 10V
C333	1-124-229-00	s ELECT 33uF 20% 10V
C334	1-124-229-00	s ELECT 33uF 20% 10V
C335	1-124-229-00	s ELECT 33uF 20% 10V
C336	1-124-229-00	s ELECT 33uF 20% 10V
C337	1-124-229-00	s ELECT 33uF 20% 10V
C338	1-124-229-00	s ELECT 33uF 20% 10V
C339	1-124-473-11	s ELECT 1000uF 20% 10V
C340	1-124-472-11	s ELECT 470uF 20% 10V
C341	1-163-251-11	s CERAMIC 100PF 5% 50V
C342	1-163-241-11	s CERAMIC, CHIP 39PF 5% 50V
C343	1-163-241-11	s CERAMIC, CHIP 39PF 5% 50V
C344	1-163-241-11	s CERAMIC, CHIP 39PF 5% 50V
CN1	1-506-476-11	s CONNECTOR, 11P, MALE
CN2	1-506-470-11	s CONNECTOR, 5P, MALE
CN3	1-506-477-11	s CONNECTOR, 12P, MALE
CN4	1-506-469-11	s CONNECTOR, 4P, MALE
CN5	1-506-474-11	s CONNECTOR, 9P, MALE
CN6	1-506-472-11	s CONNECTOR, 7P, MALE
CN7	1-506-705-11	s CONNECTOR POST HEADER, ILG (6P)
CN8	1-560-356-00	s CONNECTOR POST HEADER, ILG (2P)
CN101	1-506-470-11	s CONNECTOR, 5P, MALE
CN102	1-506-475-11	s CONNECTOR, 10P, MALE
CN103	1-506-474-11	s CONNECTOR, 9P, MALE
CN201	1-506-478-11	s CONNECTOR, 13P, MALE
CN202	1-506-471-11	s CONNECTOR, 6P, MALE
D2	8-719-104-34	s DIODE 1S2836
D3	8-719-104-34	s DIODE 1S2836
D5	8-719-101-97	s DIODE 1SS97-1
D6	8-719-104-34	s DIODE 1S2836

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
D8	8-719-104-34 s	DIODE 1S2836
D9	8-719-104-34 s	DIODE 1S2836
D11	8-719-104-34 s	DIODE 1S2836
D12	8-719-101-97 s	DIODE 1SS97-1
D14	8-719-942-31 s	DIODE HZ3ALL
D18	8-719-104-34 s	DIODE 1S2836
D19	8-719-104-34 s	DIODE 1S2836
D21	8-719-101-97 s	DIODE 1SS97-1
D22	8-719-104-34 s	DIODE 1S2836
D23	8-719-104-34 s	DIODE 1S2836
D24	8-719-104-34 s	DIODE 1S2836
D25	8-719-104-34 s	DIODE 1S2836
D26	8-719-104-34 s	DIODE 1S2836
D27	8-719-104-34 s	DIODE 1S2836
D28	8-719-104-34 s	DIODE 1S2836
D29	8-719-104-34 s	DIODE 1S2836
D30	8-719-101-97 s	DIODE 1SS97-1
D31	8-719-101-97 s	DIODE 1SS97-1
D32	8-719-800-76 s	DIODE 1SS226
D33	8-719-800-76 s	DIODE 1SS226
D34	8-719-800-76 s	DIODE 1SS226
D35	8-719-800-76 s	DIODE 1SS226
D36	8-719-104-34 s	DIODE 1S2836
D37	8-719-800-76 s	DIODE 1SS226
D38	8-719-104-34 s	DIODE 1S2836
D39	8-719-800-76 s	DIODE 1SS226
D40	8-719-104-34 s	DIODE 1S2836
D41	8-719-104-34 s	DIODE 1S2836
D42	8-719-800-76 s	DIODE 1SS226
D43	8-719-104-34 s	DIODE 1S2836
D44	8-719-104-34 s	DIODE 1S2836
D101	8-719-104-34 s	DIODE 1S2836
D102	8-719-104-34 s	DIODE 1S2836
D103	8-719-104-34 s	DIODE 1S2836
D104	8-719-400-18 s	DIODE MA152WK
D105	8-719-800-76 s	DIODE 1SS226
D106	8-719-400-18 s	DIODE MA152WK
D107	8-719-400-18 s	DIODE MA152WK
D108	8-719-400-18 s	DIODE MA152WK
D109	8-719-400-18 s	DIODE MA152WK
D110	8-719-104-34 s	DIODE 1S2836
D111	8-719-104-34 s	DIODE 1S2836
D112	8-719-105-99 s	DIODE RD6.2M-B1
D116	8-719-400-18 s	DIODE MA152WK
D117	8-719-400-18 s	DIODE MA152WK
D118	8-719-104-34 s	DIODE 1S2836
D119	8-719-400-18 s	DIODE MA152WK
D120	8-719-104-34 s	DIODE 1S2836
D121	8-719-104-34 s	DIODE 1S2836
D122	8-719-104-34 s	DIODE 1S2836
D201	8-719-104-34 s	DIODE 1S2836
D202	8-719-104-34 s	DIODE 1S2836
D203	8-719-106-52 s	DIODE RD10M-B1
D204	8-719-106-52 s	DIODE RD10M-B1
D205	8-719-106-52 s	DIODE RD10M-B1
D206	8-719-104-34 s	DIODE 1S2836
D207	8-719-104-34 s	DIODE 1S2836
D208	8-719-800-76 s	DIODE 1SS226
D209	8-719-400-18 s	DIODE MA152WK

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
D210	8-719-104-34 s	DIODE 1S2836
D211	8-719-104-34 s	DIODE 1S2836
D212	8-719-104-34 s	DIODE 1S2836
D213	8-719-104-34 s	DIODE 1S2836
D214	8-719-106-22 s	DIODE RD7.5M-B1
D215	8-719-104-34 s	DIODE 1S2836
D216	8-719-106-22 s	DIODE RD7.5M-B1
D217	8-719-104-34 s	DIODE 1S2836
D218	8-719-106-22 s	DIODE RD7.5M-B1
DL1	1-415-837-11 s	DELAY LINE 130nS
DL2	1-415-837-11 s	DELAY LINE 130nS
FL1	1-236-183-11 s	FILTER, TRAP
FL2	1-236-183-11 s	FILTER, TRAP
FL3	1-236-183-11 s	FILTER, TRAP
IC1	8-759-908-16 s	IC TL072CPS
IC2	8-759-981-51 s	IC RC1496M
IC3	1-807-837-21 s	IC GAM
IC5	1-809-410-11 s	IC
IC6	8-759-908-16 s	IC TL072CPS
IC7	8-759-981-51 s	IC RC1496M
IC8	8-759-204-51 s	IC TC40H008F
IC9	1-807-840-11 s	IC CBG
IC10	1-807-837-21 s	IC GAM
IC11	1-809-410-11 s	IC
IC12	8-759-300-71 s	IC HD14053BFP
IC13	8-759-908-16 s	IC TL072CPS
IC14	8-759-981-51 s	IC RC1496M
IC15	1-807-837-21 s	IC GAM
IC16	1-809-410-11 s	IC
IC17	8-759-300-71 s	IC HD14053BFP
IC18	8-759-945-72 s	IC OP-07DPS
IC19	8-759-300-71 s	IC HD14053BFP
IC20	8-759-945-72 s	IC OP-07DPS
IC21	8-759-300-71 s	IC HD14053BFP
IC22	8-759-945-72 s	IC OP-07DPS
IC23	8-759-300-71 s	IC HD14053BFP
IC24	8-759-230-99 s	IC TC74HC4053AF
IC101	8-759-300-71 s	IC HD14053BFP
IC102	8-759-101-12 s	IC UPC311G2
IC103	8-759-981-65 s	IC LM2903M
IC104	8-759-906-54 s	IC TL064CNS
IC105	8-759-300-71 s	IC HD14053BFP
IC106	8-759-906-54 s	IC TL064CNS
IC107	8-759-009-10 s	IC MC14069UBF
IC108	8-759-303-31 s	IC HD44860B42
IC109	8-759-009-05 s	IC TC4051BF
IC110	8-759-009-05 s	IC TC4051BF
IC111	8-759-906-54 s	IC TL064CNS
IC112	8-759-906-54 s	IC TL064CNS
IC113	8-759-906-54 s	IC TL064CNS
IC114	8-759-300-71 s	IC HD14053BFP
IC115	8-759-402-31 s	IC MN1237A
IC116	8-759-200-67 s	IC TC4001BF
IC117	8-759-009-10 s	IC MC14069UBF
IC118	8-759-030-16 s	IC MC34182M
IC119	8-759-300-71 s	IC HD14053BFP
IC120	8-759-300-71 s	IC HD14053BFP
IC121	8-759-946-03 s	IC S-8054ALR-LN-S

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
IC122	8-759-946-03 s	IC S-8054ALR-LN-S
L1	1-408-413-00 s	INDUCTOR 22uH
L2	1-408-399-00 s	INDUCTOR 1.5uH
L3	1-408-399-00 s	INDUCTOR 1.5uH
L4	1-408-399-00 s	INDUCTOR 1.5uH
L103	1-408-421-00 s	INDUCTOR 100uH
L201	1-421-013-00 s	COIL (HORIZONTAL CHOKE) 25uH
L202	1-410-470-11 s	INDUCTOR 10uH
Q1	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q2	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q3	8-729-100-66 s	TRANSISTOR 2SC1623
Q4	8-729-109-44 s	TRANSISTOR 2SK94
Q5	8-729-100-66 s	TRANSISTOR 2SC1623
Q6	8-729-100-66 s	TRANSISTOR 2SC1623
Q7	8-729-100-66 s	TRANSISTOR 2SC1623
Q13	8-729-100-66 s	TRANSISTOR 2SC1623
Q14	8-729-100-66 s	TRANSISTOR 2SC1623
Q16	8-729-109-44 s	TRANSISTOR 2SK94
Q17	8-729-109-44 s	TRANSISTOR 2SK94
Q18	8-729-109-44 s	TRANSISTOR 2SK94
Q19	8-729-109-44 s	TRANSISTOR 2SK94
Q20	8-729-122-63 s	TRANSISTOR 2SA1226
Q21	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q22	8-729-100-66 s	TRANSISTOR 2SC1623
Q23	8-729-216-22 s	TRANSISTOR 2SA1162
Q24	8-729-109-44 s	TRANSISTOR 2SK94
Q25	8-729-109-44 s	TRANSISTOR 2SK94
Q26	8-729-109-44 s	TRANSISTOR 2SK94
Q27	8-729-100-66 s	TRANSISTOR 2SC1623
Q28	8-729-100-66 s	TRANSISTOR 2SC1623
Q29	8-729-122-63 s	TRANSISTOR 2SA1226
Q30	8-729-216-22 s	TRANSISTOR 2SA1162
Q31	8-729-100-66 s	TRANSISTOR 2SC1623
Q32	8-729-109-44 s	TRANSISTOR 2SK94
Q34	8-729-100-66 s	TRANSISTOR 2SC1623
Q35	8-729-216-22 s	TRANSISTOR 2SA1162
Q36	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q37	8-729-100-66 s	TRANSISTOR 2SC1623
Q38	8-729-109-44 s	TRANSISTOR 2SK94
Q39	8-729-109-44 s	TRANSISTOR 2SK94
Q40	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q41	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q42	8-729-100-66 s	TRANSISTOR 2SC1623
Q43	8-729-100-66 s	TRANSISTOR 2SC1623
Q44	8-729-100-66 s	TRANSISTOR 2SC1623
Q49	8-729-100-66 s	TRANSISTOR 2SC1623
Q51	8-729-100-66 s	TRANSISTOR 2SC1623
Q52	8-729-109-44 s	TRANSISTOR 2SK94
Q53	8-729-109-44 s	TRANSISTOR 2SK94
Q54	8-729-109-44 s	TRANSISTOR 2SK94
Q55	8-729-109-44 s	TRANSISTOR 2SK94
Q56	8-729-122-63 s	TRANSISTOR 2SA1226
Q57	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q58	8-729-100-66 s	TRANSISTOR 2SC1623
Q59	8-729-216-22 s	TRANSISTOR 2SA1162
Q60	8-729-109-44 s	TRANSISTOR 2SK94
Q61	8-729-109-44 s	TRANSISTOR 2SK94
Q62	8-729-109-44 s	TRANSISTOR 2SK94

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Ref. No. or Q'ty	Part No.	SP Description
Q63	8-729-100-66 s	TRANSISTOR 2SC1623
Q64	8-729-100-66 s	TRANSISTOR 2SC1623
Q65	8-729-216-22 s	TRANSISTOR 2SA1162
Q66	8-729-122-63 s	TRANSISTOR 2SA1226
Q67	8-729-100-66 s	TRANSISTOR 2SC1623
Q68	8-729-109-44 s	TRANSISTOR 2SK94
Q71	8-729-216-22 s	TRANSISTOR 2SA1162
Q72	8-729-100-66 s	TRANSISTOR 2SC1623
Q74	8-729-100-66 s	TRANSISTOR 2SC1623
Q75	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q76	8-729-100-66 s	TRANSISTOR 2SC1623
Q77	8-729-109-44 s	TRANSISTOR 2SK94
Q78	8-729-109-44 s	TRANSISTOR 2SK94
Q79	8-729-216-22 s	TRANSISTOR 2SA1162
Q80	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q81	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q82	8-729-109-44 s	TRANSISTOR 2SK94
Q83	8-729-100-66 s	TRANSISTOR 2SC1623
Q84	8-729-100-66 s	TRANSISTOR 2SC1623
Q85	8-729-100-66 s	TRANSISTOR 2SC1623
Q90	8-729-100-66 s	TRANSISTOR 2SC1623
Q91	8-729-100-66 s	TRANSISTOR 2SC1623
Q92	8-729-100-66 s	TRANSISTOR 2SC1623
Q93	8-729-109-44 s	TRANSISTOR 2SK94
Q94	8-729-109-44 s	TRANSISTOR 2SK94
Q95	8-729-109-44 s	TRANSISTOR 2SK94
Q96	8-729-109-44 s	TRANSISTOR 2SK94
Q97	8-729-122-63 s	TRANSISTOR 2SA1226
Q98	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q99	8-729-100-66 s	TRANSISTOR 2SC1623
Q100	8-729-216-22 s	TRANSISTOR 2SA1162
Q101	8-729-109-44 s	TRANSISTOR 2SK94
Q102	8-729-109-44 s	TRANSISTOR 2SK94
Q103	8-729-109-44 s	TRANSISTOR 2SK94
Q104	8-729-100-66 s	TRANSISTOR 2SC1623
Q105	8-729-100-66 s	TRANSISTOR 2SC1623
Q106	8-729-122-63 s	TRANSISTOR 2SA1226
Q107	8-729-216-22 s	TRANSISTOR 2SA1162
Q108	8-729-100-66 s	TRANSISTOR 2SC1623
Q109	8-729-109-44 s	TRANSISTOR 2SK94
Q110	8-729-100-66 s	TRANSISTOR 2SC1623
Q112	8-729-216-22 s	TRANSISTOR 2SA1162
Q113	8-729-100-66 s	TRANSISTOR 2SC1623
Q114	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q115	8-729-100-66 s	TRANSISTOR 2SC1623
Q116	8-729-109-44 s	TRANSISTOR 2SK94
Q117	8-729-109-44 s	TRANSISTOR 2SK94
Q118	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q119	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q120	8-729-100-66 s	TRANSISTOR 2SC1623
Q121	8-729-100-66 s	TRANSISTOR 2SC1623
Q122	8-729-100-66 s	TRANSISTOR 2SC1623
Q123	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q124	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q125	8-729-100-66 s	TRANSISTOR 2SC1623
Q126	8-729-100-66 s	TRANSISTOR 2SC1623
Q127	8-729-100-66 s	TRANSISTOR 2SC1623
Q128	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q129	8-729-175-72 s	TRANSISTOR 2SC2757-T33

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

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Ref. No. or Q'ty	Part No.	SP Description
Q130	8-729-100-66 s	TRANSISTOR 2SC1623
Q131	8-729-100-66 s	TRANSISTOR 2SC1623
Q132	8-729-100-66 s	TRANSISTOR 2SC1623
Q134	8-729-100-66 s	TRANSISTOR 2SC1623
Q135	8-729-216-22 s	TRANSISTOR 2SA1162
Q136	8-729-100-66 s	TRANSISTOR 2SC1623
Q137	8-729-216-22 s	TRANSISTOR 2SA1162
Q138	8-729-100-66 s	TRANSISTOR 2SC1623
Q139	8-729-216-22 s	TRANSISTOR 2SA1162
Q140	8-729-100-66 s	TRANSISTOR 2SC1623
Q141	8-729-216-22 s	TRANSISTOR 2SA1162
Q142	8-729-216-22 s	TRANSISTOR 2SA1162
Q143	8-729-216-22 s	TRANSISTOR 2SA1162
Q144	8-729-216-22 s	TRANSISTOR 2SA1162
Q145	8-729-100-66 s	TRANSISTOR 2SC1623
Q146	8-729-216-22 s	TRANSISTOR 2SA1162
Q147	8-729-100-66 s	TRANSISTOR 2SC1623
Q201	8-729-216-22 s	TRANSISTOR 2SA1162
Q202	8-729-216-22 s	TRANSISTOR 2SA1162
Q203	8-729-100-66 s	TRANSISTOR 2SC1623
Q204	8-729-100-66 s	TRANSISTOR 2SC1623
Q205	8-729-100-66 s	TRANSISTOR 2SC1623
Q206	8-729-100-66 s	TRANSISTOR 2SC1623
Q207	8-729-100-66 s	TRANSISTOR 2SC1623
Q208	8-729-100-66 s	TRANSISTOR 2SC1623
Q209	8-729-100-66 s	TRANSISTOR 2SC1623
Q210	8-729-216-22 s	TRANSISTOR 2SA1162
Q211	8-729-100-66 s	TRANSISTOR 2SC1623
Q212	8-729-216-22 s	TRANSISTOR 2SA1162
Q213	8-729-109-44 s	TRANSISTOR 2SK94
Q214	8-729-100-66 s	TRANSISTOR 2SC1623
Q215	8-729-100-66 s	TRANSISTOR 2SC1623
Q216	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q217	8-729-100-66 s	TRANSISTOR 2SC1623
Q218	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q219	8-729-122-63 s	TRANSISTOR 2SA1226
Q220	8-729-100-66 s	TRANSISTOR 2SC1623
Q221	8-729-100-66 s	TRANSISTOR 2SC1623
Q222	8-729-216-22 s	TRANSISTOR 2SA1162
Q224	8-729-100-66 s	TRANSISTOR 2SC1623
Q227	8-729-100-66 s	TRANSISTOR 2SC1623
Q228	8-729-100-66 s	TRANSISTOR 2SC1623
Q229	8-729-100-66 s	TRANSISTOR 2SC1623
Q230	8-729-100-66 s	TRANSISTOR 2SC1623
Q231	8-729-216-22 s	TRANSISTOR 2SA1162
Q232	8-729-216-22 s	TRANSISTOR 2SA1162
Q233	8-729-216-22 s	TRANSISTOR 2SA1162
Q234	8-729-100-66 s	TRANSISTOR 2SC1623
Q235	8-729-100-66 s	TRANSISTOR 2SC1623
Q236	8-729-216-22 s	TRANSISTOR 2SA1162
Q237	8-729-100-66 s	TRANSISTOR 2SC1623
Q238	8-729-100-66 s	TRANSISTOR 2SC1623
Q301	8-729-216-22 s	TRANSISTOR 2SA1162
Q302	8-729-100-66 s	TRANSISTOR 2SC1623
Q303	8-729-100-66 s	TRANSISTOR 2SC1623
Q304	8-729-122-63 s	TRANSISTOR 2SA1226
Q305	8-729-216-22 s	TRANSISTOR 2SA1162
Q306	8-729-100-66 s	TRANSISTOR 2SC1623
Q307	8-729-100-66 s	TRANSISTOR 2SC1623

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Ref. No. or Q'ty	Part No.	SP Description
Q308	8-729-122-63 s	TRANSISTOR 2SA1226
Q309	8-729-216-22 s	TRANSISTOR 2SA1162
Q310	8-729-100-66 s	TRANSISTOR 2SC1623
Q311	8-729-100-66 s	TRANSISTOR 2SC1623
Q312	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q313	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q314	8-729-100-66 s	TRANSISTOR 2SC1623
Q315	8-729-122-63 s	TRANSISTOR 2SA1226
Q316	8-729-216-22 s	TRANSISTOR 2SA1162
Q317	8-729-122-63 s	TRANSISTOR 2SA1226
Q318	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q319	8-729-100-66 s	TRANSISTOR 2SC1623
Q320	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q321	8-729-100-66 s	TRANSISTOR 2SC1623
Q322	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q323	8-729-100-66 s	TRANSISTOR 2SC1623
Q324	8-729-100-66 s	TRANSISTOR 2SC1623
Q325	8-729-100-66 s	TRANSISTOR 2SC1623
Q326	8-729-100-66 s	TRANSISTOR 2SC1623
Q327	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q328	8-729-100-66 s	TRANSISTOR 2SC1623
Q329	8-729-109-44 s	TRANSISTOR 2SK94
Q330	8-729-109-44 s	TRANSISTOR 2SK94
Q331	8-729-216-22 s	TRANSISTOR 2SA1162
Q332	8-729-100-66 s	TRANSISTOR 2SC1623
Q333	8-729-100-66 s	TRANSISTOR 2SC1623
Q334	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q335	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q336	8-729-100-66 s	TRANSISTOR 2SC1623
Q337	8-729-100-66 s	TRANSISTOR 2SC1623
Q338	8-729-109-44 s	TRANSISTOR 2SK94
Q339	8-729-109-44 s	TRANSISTOR 2SK94
Q340	8-729-216-22 s	TRANSISTOR 2SA1162
Q341	8-729-100-66 s	TRANSISTOR 2SC1623
Q342	8-729-100-66 s	TRANSISTOR 2SC1623
Q343	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q344	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q345	8-729-100-66 s	TRANSISTOR 2SC1623
Q346	8-729-100-66 s	TRANSISTOR 2SC1623
Q347	8-729-109-44 s	TRANSISTOR 2SK94
Q348	8-729-109-44 s	TRANSISTOR 2SK94
Q349	8-729-216-22 s	TRANSISTOR 2SA1162
Q350	8-729-216-22 s	TRANSISTOR 2SA1162
Q351	8-729-100-66 s	TRANSISTOR 2SC1623
Q352	8-729-100-66 s	TRANSISTOR 2SC1623
R2	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R3	1-216-748-11 s	METAL, CHIP 39K 1% 1/10W
R36	1-216-670-11 s	METAL, CHIP 6.2K 0.5% 1/10W
R37	1-216-650-11 s	METAL, CHIP 910 0.5% 1/10W
R38	1-216-647-11 s	METAL, CHIP 680 0.5% 1/10W
R39	1-216-615-11 s	METAL, CHIP 33 0.5% 1/10W
R41	1-216-625-11 s	METAL, CHIP 82 0.5% 1/10W
R43	1-216-618-11 s	METAL, CHIP 43 0.5% 1/10W
R45	1-216-618-11 s	METAL, CHIP 43 0.5% 1/10W
R50	1-216-654-11 s	METAL, CHIP 1.3K 0.5% 1/10W
R51	1-216-655-11 s	METAL, CHIP 1.5K 0.5% 1/10W
R52	1-216-633-11 s	METAL, CHIP 180 0.5% 1/10W
R58	1-216-650-11 s	METAL, CHIP 910 0.5% 1/10W
R66	1-216-661-11 s	METAL, CHIP 2.7K 0.5% 1/10W

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R67	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R69	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R75	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R76	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R79	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R82	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R83	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R88	1-216-689-11	s METAL, CHIP 39K 0.5% 1/10W
R90	1-216-679-11	s METAL, CHIP 15K 0.5% 1/10W
R92	1-216-653-11	s METAL, CHIP 1.2K 0.5% 1/10W
R93	1-216-669-11	s METAL, CHIP 5.6K 0.5% 1/10W
R111	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R112	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R138	1-216-670-11	s METAL, CHIP 6.2K 0.5% 1/10W
R140	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R141	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R142	1-216-615-11	s METAL, CHIP 33 0.5% 1/10W
R143	1-216-625-11	s METAL, CHIP 82 0.5% 1/10W
R144	1-216-618-11	s METAL, CHIP 43 0.5% 1/10W
R145	1-216-618-11	s METAL, CHIP 43 0.5% 1/10W
R153	1-216-655-11	s METAL, CHIP 1.5K 0.5% 1/10W
R154	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R155	1-216-633-11	s METAL, CHIP 180 0.5% 1/10W
R161	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R162	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R171	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R172	1-216-661-11	s METAL, CHIP 2.7K 0.5% 1/10W
R173	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R180	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R181	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R183	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R185	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R186	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R189	1-216-689-11	s METAL, CHIP 39K 0.5% 1/10W
R190	1-216-679-11	s METAL, CHIP 15K 0.5% 1/10W
R196	1-216-653-11	s METAL, CHIP 1.2K 0.5% 1/10W
R198	1-216-669-11	s METAL, CHIP 5.6K 0.5% 1/10W
R222	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R228	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R229	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R259	1-216-670-11	s METAL, CHIP 6.2K 0.5% 1/10W
R261	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R262	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R263	1-216-615-11	s METAL, CHIP 33 0.5% 1/10W
R264	1-216-625-11	s METAL, CHIP 82 0.5% 1/10W
R265	1-216-618-11	s METAL, CHIP 43 0.5% 1/10W
R266	1-216-618-11	s METAL, CHIP 43 0.5% 1/10W
R281	1-216-655-11	s METAL, CHIP 1.5K 0.5% 1/10W
R282	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R283	1-216-633-11	s METAL, CHIP 180 0.5% 1/10W
R299	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R300	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R307	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R308	1-216-661-11	s METAL, CHIP 2.7K 0.5% 1/10W
R309	1-216-650-11	s METAL, CHIP 910 0.5% 1/10W
R320	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R321	1-216-645-11	s METAL, CHIP 560 0.5% 1/10W
R323	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R326	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R327	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R332	1-216-689-11	s METAL, CHIP 39K 0.5% 1/10W
R334	1-216-653-11	s METAL, CHIP 1.2K 0.5% 1/10W
R336	1-216-679-11	s METAL, CHIP 15K 0.5% 1/10W
R337	1-216-669-11	s METAL, CHIP 5.6K 0.5% 1/10W
R381	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R491	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R498	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R502	1-216-699-11	s METAL, CHIP 100K 0.5% 1/10W
R601	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R602	1-216-673-11	s METAL, CHIP 8.2K 0.5% 1/10W
R604	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R606	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R610	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R612	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R614	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R615	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R616	1-216-673-11	s METAL, CHIP 8.2K 0.5% 1/10W
R618	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R622	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R624	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R625	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R627	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R628	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R629	1-216-673-11	s METAL, CHIP 8.2K 0.5% 1/10W
R633	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R655	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R680	1-216-699-11	s METAL, CHIP 100K 0.5% 1/10W
R681	1-216-699-11	s METAL, CHIP 100K 0.5% 1/10W
R682	1-216-699-11	s METAL, CHIP 100K 0.5% 1/10W
R686	1-218-256-11	s METAL, CHIP 3.32K 0.5% 1/10W
R687	1-216-656-11	s METAL, CHIP 1.6K 0.5% 1/10W
R688	1-218-258-11	s METAL, CHIP 9.09K 0.5% 1/10W
R689	1-216-627-11	s METAL, CHIP 100 0.5% 1/10W
R690	1-218-254-11	s METAL, CHIP 2.55K 0.5% 1/10W
R691	1-218-259-11	s METAL, CHIP 13.7K 0.5% 1/10W
R692	1-216-627-11	s METAL, CHIP 100 0.5% 1/10W
R693	1-218-254-11	s METAL, CHIP 2.55K 0.5% 1/10W
R694	1-218-257-11	s METAL, CHIP 4.99K 0.5% 1/10W
R708	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R724	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R737	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R742	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R745	1-216-627-11	s METAL, CHIP 100 0.5% 1/10W
R753	1-216-665-11	s METAL, CHIP 3.9K 0.5% 1/10W
R809	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R809	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R813	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R813	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R817	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R817	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
RB101	1-231-387-00	s COMPOSITION CIRCUIT BLOCK
RV1	1-230-520-11	s RES, ADJ, METAL 1K
RV2	1-230-521-11	s RES, ADJ, METAL 2.2K
RV3	1-230-521-11	s RES, ADJ, METAL 2.2K
RV4	1-230-522-11	s RES, ADJ, METAL 4.7K
RV5	1-230-522-11	s RES, ADJ, METAL 4.7K

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(PR-162P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
RV6	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV7	1-230-526-11 s	RES, ADJ, METAL 47K
RV8	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV9	1-230-526-11 s	RES, ADJ, METAL 47K
RV10	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV11	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV12	1-230-523-11 s	RES, ADJ, METAL 10K
RV13	1-230-523-11 s	RES, ADJ, METAL 10K
RV14	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV15	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV16	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV17	1-230-523-11 s	RES, ADJ, METAL 10K
RV18	1-230-523-11 s	RES, ADJ, METAL 10K
RV19	1-230-520-11 s	RES, ADJ, METAL 1K
RV20	1-230-523-11 s	RES, ADJ, METAL 10K
RV21	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV22	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV23	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV24	1-230-519-11 s	RES, ADJ, METAL 470
RV25	1-230-519-11 s	RES, ADJ, METAL 470
RV26	1-230-519-11 s	RES, ADJ, METAL 470
RV27	1-230-526-11 s	RES, ADJ, METAL 47K
RV28	1-230-523-11 s	RES, ADJ, METAL 10K
RV29	1-230-523-11 s	RES, ADJ, METAL 10K
RV30	1-230-526-11 s	RES, ADJ, METAL 47K
RV31	1-230-526-11 s	RES, ADJ, METAL 47K
RV32	1-237-034-11 s	RES, ADJ, METAL 2K
RV33	1-237-034-11 s	RES, ADJ, METAL 2K
RV34	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV35	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV36	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV101	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV102	1-230-524-11 s	RES, ADJ, METAL 22K
RV103	1-230-521-11 s	RES, ADJ, METAL 2.2K
RV201	1-230-522-11 s	RES, ADJ, METAL 4.7K
RV202	1-230-519-11 s	RES, ADJ, METAL 470
RV203	1-230-519-11 s	RES, ADJ, METAL 470
RV204	1-230-519-11 s	RES, ADJ, METAL 470
S1	1-570-374-12 s	SWITCH, SLIDE
S2	1-553-977-00 s	SWITCH, SLIDE
S101	1-553-977-00 s	SWITCH, SLIDE
X101	1-527-532-00 s	OSCILLATOR, CERAMIC 400.0KHZ

SG-150P BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-7513-953-A o	MOUNTED CIRCUIT BOARD, SG-150P
1pc	1-942-587-11 o	HARNESS (SG-A)
1pc	1-942-588-11 o	HARNESS (SG-B)
1pc	1-942-589-11 o	HARNESS (SG-C)
1pc	1-942-590-11 o	HARNESS (SG-D)
C2	1-131-374-00 s	TANTALUM 33uF 10% 16V
C3	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C4	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C6	1-131-374-00 s	TANTALUM 33uF 10% 16V
C7	1-163-251-11 s	CERAMIC 100PF 5% 50V
C9	1-163-251-11 s	CERAMIC 100PF 5% 50V
C10	1-131-341-00 s	TANTALUM 0.1uF 10% 35V
C14	1-131-374-00 s	TANTALUM 33uF 10% 16V
C16	1-131-374-00 s	TANTALUM 33uF 10% 16V
C17	1-124-584-00 s	ELECT 100uF 20% 10V
C19	1-163-251-11 s	CERAMIC 100PF 5% 50V
C20	1-163-138-00 s	CERAMIC, CHIP 750PF 5% 50V
C22	1-131-374-00 s	TANTALUM 33uF 10% 16V
C25	1-131-347-00 s	TANTALUM 1uF 10% 35V
C26	1-163-235-11 s	CERAMIC 22PF 5% 50V
C27	1-163-251-11 s	CERAMIC 100PF 5% 50V
C28	1-163-227-11 s	CERAMIC 10PF 5% 50V
C33	1-131-377-00 s	TANTALUM 10uF 10% 10V
C34	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C35	1-131-370-00 s	TANTALUM 6.8uF 10% 16V
C36	1-131-365-00 s	TANTALUM 10uF 10% 20V
C37	1-131-377-00 s	TANTALUM 10uF 10% 10V
C39	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C40	1-163-115-00 s	CERAMIC, CHIP 82PF 5% 50V
C41	1-131-347-00 s	TANTALUM 1uF 10% 35V
CV2	1-141-304-21 s	CAP, TRIMMER 10PF
D1	8-719-800-76 s	DIODE 1SS226
D3	8-719-907-19 s	DIODE, VARICAP FC52M-5
FB1	1-543-469-11 s	BEAD, FERRITE (CHIP)
FB2	1-543-469-11 s	BEAD, FERRITE (CHIP)
FB3	1-543-469-11 s	BEAD, FERRITE (CHIP)
IC1	8-759-926-23 s	IC SN74HC16NS
IC2	8-759-926-24 s	IC SN74HC164NS
IC3	8-759-143-95 s	IC uPD74HC221AGS
IC4	8-759-907-81 s	IC SN74LS221NS
IC5	8-759-009-02 s	IC MC14046BF
IC6	8-752-332-67 s	IC CXD1217M
IC7	8-759-926-07 s	IC SN74HC132NS
IC8	8-759-925-80 s	IC SN74HC14NS
IC9	8-759-929-21 s	IC TLC27L2CPS
IC10	8-759-973-99 s	IC CXD1361M
L1	1-410-470-11 s	INDUCTOR 10uH
L2	1-410-470-11 s	INDUCTOR 10uH
L3	1-410-460-11 s	INDUCTOR 1.5uH
L4	1-410-460-11 s	INDUCTOR 1.5uH
L5	1-410-509-11 s	INDUCTOR 10uH
L6	1-410-470-11 s	INDUCTOR 10uH
Q1	8-729-216-22 s	TRANSISTOR 2SA1162
Q2	8-729-216-22 s	TRANSISTOR 2SA1162
Q3	8-729-119-78 s	TRANSISTOR 2SC2603-E
Q4	8-729-216-22 s	TRANSISTOR 2SA1162
Q5	8-729-109-44 s	TRANSISTOR 2SK94

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-150P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
Q6	8-729-216-22	s TRANSISTOR 2SA1162
Q7	8-729-100-66	s TRANSISTOR 2SC1623
Q9	8-729-216-22	s TRANSISTOR 2SA1162
R13	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R14	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R18	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R20	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W
R36	1-216-684-11	s METAL, CHIP 24K 0.5% 1/10W
R50	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W
R51	1-216-699-11	s METAL, CHIP 100K 0.5% 1/10W
R60	1-216-679-11	s METAL, CHIP 15K 0.5% 1/10W
R61	1-216-665-11	s METAL, CHIP 3.9K 0.5% 1/10W
R62	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R63	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
X1	1-577-465-11	s OSCILLATOR, CRYSTAL 14.750MHZ

SG-198P BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-7615-333-A	o MOUNTED CIRCUIT BOARD "SG-198P ASSY" (INCLUDING SG-150P BOARD)
C2	1-124-621-11	s ELECT 3300uF 20% 6.3V
C3	1-126-157-11	s ELECT 10uF 20% 16V
C4	1-126-157-11	s ELECT 10uF 20% 16V
C6	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C7	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C8	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C9	1-131-377-00	s TANTALUM 10uF 10% 10V
C10	1-163-115-00	s CERAMIC, CHIP 82PF 5% 50V
C17	1-126-157-11	s ELECT 10uF 20% 16V
C22	1-124-229-00	s ELECT 33uF 20% 10V
C24	1-124-229-00	s ELECT 33uF 20% 10V
C25	1-107-157-00	s MICA 27PF 5% 500V
C26	1-131-349-00	s TANTALUM 2.2uF 10% 35V
C27	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C28	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C29	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C30	1-131-345-00	s TANTALUM 0.47uF 10% 35V
C31	1-131-345-00	s TANTALUM 0.47uF 10% 35V
C32	1-131-343-00	s TANTALUM 0.22uF 10% 35V
C33	1-126-529-11	s ELECT 0.47uF 20% 50V
C34	1-124-499-11	s ELECT, NONPOLAR 1uF 20% 50V
C37	1-126-157-11	s ELECT 10uF 20% 16V
C42	1-124-229-00	s ELECT 33uF 20% 10V
C44	1-124-229-00	s ELECT 33uF 20% 10V
C45	1-124-229-00	s ELECT 33uF 20% 10V
C47	1-107-208-00	s MICA 18PF 5% 500V
C48	1-131-349-00	s TANTALUM 2.2uF 10% 35V
C49	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C50	1-126-529-11	s ELECT 0.47uF 20% 50V
C51	1-124-499-11	s ELECT, NONPOLAR 1uF 20% 50V
C52	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C53	1-124-229-00	s ELECT 33uF 20% 10V
C54	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C55	1-124-229-00	s ELECT 33uF 20% 10V
C56	1-131-365-00	s TANTALUM 10uF 10% 20V
C57	1-163-098-00	s CERAMIC, CHIP 16PF 5% 50V
C58	1-163-098-00	s CERAMIC, CHIP 16PF 5% 50V
C59	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C60	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C63	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C64	1-131-377-00	s TANTALUM 10uF 10% 10V
C69	1-131-365-00	s TANTALUM 10uF 10% 20V
C71	1-126-157-11	s ELECT 10uF 20% 16V
C73	1-126-157-11	s ELECT 10uF 20% 16V
C74	1-124-229-00	s ELECT 33uF 20% 10V
C76	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C77	1-126-157-11	s ELECT 10uF 20% 16V
C78	1-126-157-11	s ELECT 10uF 20% 16V
C79	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C80	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C81	1-163-227-11	s CERAMIC 10PF 5% 50V
C82	1-124-242-00	s ELECT 33uF 20% 25V
C83	1-131-377-00	s TANTALUM 10uF 10% 10V
C85	1-131-377-00	s TANTALUM 10uF 10% 10V
C87	1-124-584-00	s ELECT 100uF 20% 10V
C88	1-124-589-11	s ELECT 47uF 20% 16V

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C89	1-163-084-00	s CERAMIC, CHIP 1.5PF 50V
C90	1-124-589-11	s ELECT 47uF 20% 16V
C91	1-131-347-00	s TANTALUM 1uF 10% 35V
C92	1-131-347-00	s TANTALUM 1uF 10% 35V
C93	1-131-347-00	s TANTALUM 1uF 10% 35V
C94	1-131-347-00	s TANTALUM 1uF 10% 35V
C95	1-131-374-00	s TANTALUM 33uF 10% 16V
C96	1-131-379-00	s TANTALUM 22uF 10% 10V
C98	1-131-347-00	s TANTALUM 1uF 10% 35V
C99	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C100	1-163-263-11	s CERAMIC 330PF 5% 50V
C101	1-126-157-11	s ELECT 10uF 20% 16V
C102	1-131-377-00	s TANTALUM 10uF 10% 10V
C103	1-131-377-00	s TANTALUM 10uF 10% 10V
C104	1-124-472-11	s ELECT 470uF 20% 10V
C105	1-124-472-11	s ELECT 470uF 20% 10V
C106	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C107	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C108	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C109	1-131-363-00	s TANTALUM 4.7uF 10% 20V
C110	1-163-100-00	s CERAMIC, CHIP 20PF 5% 50V
C111	1-163-108-00	s CERAMIC, CHIP 43PF 5% 50V
C112	1-163-100-00	s CERAMIC, CHIP 20PF 5% 50V
C113	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C117	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C120	1-126-101-11	s ELECT 100uF 20% 16V
C121	1-124-584-00	s ELECT 100uF 20% 10V
C122	1-124-584-00	s ELECT 100uF 20% 10V
C126	1-163-227-11	s CERAMIC 10PF 5% 50V
C127	1-163-104-00	s CERAMIC, CHIP 30PF 5% 50V
C129	1-163-227-11	s CERAMIC 10PF 5% 50V
C130	1-163-251-11	s CERAMIC 100PF 5% 50V
C131	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C132	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C133	1-163-123-00	s CERAMIC, CHIP 180PF 5% 50V
C134	1-131-377-00	s TANTALUM 10uF 10% 10V
C135	1-163-086-00	s CERAMIC, CHIP 3PF 50V
C202	1-124-584-00	s ELECT 100uF 20% 10V
C203	1-124-584-00	s ELECT 100uF 20% 10V
C206	1-126-157-11	s ELECT 10uF 20% 16V
C207	1-163-251-11	s CERAMIC 100PF 5% 50V
C208	1-163-251-11	s CERAMIC 100PF 5% 50V
C209	1-163-251-11	s CERAMIC 100PF 5% 50V
C210	1-131-349-00	s TANTALUM 2.2uF 10% 35V
C211	1-131-347-00	s TANTALUM 1uF 10% 35V
C212	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C214	1-131-377-00	s TANTALUM 10uF 10% 10V
C215	1-126-157-11	s ELECT 10uF 20% 16V
C216	1-124-584-00	s ELECT 100uF 20% 10V
C217	1-126-176-11	s ELECT 220uF 20% 10V
C218	1-163-099-00	s CERAMIC, CHIP 18PF 5% 50V
C219	1-163-103-00	s CERAMIC, CHIP 27PF 5% 50V
C221	1-163-251-11	s CERAMIC 100PF 5% 50V
C222	1-163-037-11	s CERAMIC, CHIP 0.022uF 10% 25V
C223	1-131-377-00	s TANTALUM 10uF 10% 10V
C224	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C227	1-131-377-00	s TANTALUM 10uF 10% 10V
C228	1-126-157-11	s ELECT 10uF 20% 16V
C229	1-163-241-11	s CERAMIC, CHIP 39PF 5% 50V

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C230	1-131-344-00	s TANTALUM 0.33uF 10% 35V
C231	1-131-341-00	s TANTALUM 0.1uF 10% 35V
C233	1-131-377-00	s TANTALUM 10uF 10% 10V
C234	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C235	1-131-341-00	s TANTALUM 0.1uF 10% 35V
C236	1-131-375-00	s TANTALUM 4.7uF 10% 10V
C237	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C238	1-126-157-11	s ELECT 10uF 20% 16V
C239	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C240	1-163-099-00	s CERAMIC, CHIP 18PF 5% 50V
C241	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C242	1-131-377-00	s TANTALUM 10uF 10% 10V
C245	1-126-157-11	s ELECT 10uF 20% 16V
C246	1-131-377-00	s TANTALUM 10uF 10% 10V
C247	1-126-157-11	s ELECT 10uF 20% 16V
C250	1-126-157-11	s ELECT 10uF 20% 16V
C251	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C254	1-163-235-11	s CERAMIC 22PF 5% 50V
C255	1-163-235-11	s CERAMIC 22PF 5% 50V
C257	1-163-251-11	s CERAMIC 100PF 5% 50V
C259	1-163-124-00	s CERAMIC, CHIP 200PF 5% 50V
C263	1-126-157-11	s ELECT 10uF 20% 16V
C264	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C266	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C267	1-131-377-00	s TANTALUM 10uF 10% 10V
C268	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C269	1-131-374-00	s TANTALUM 33uF 10% 16V
C270	1-131-377-00	s TANTALUM 10uF 10% 10V
C271	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C272	1-131-377-00	s TANTALUM 10uF 10% 10V
C276	1-131-377-00	s TANTALUM 10uF 10% 10V
C277	1-131-343-00	s TANTALUM 0.22uF 10% 35V
C280	1-131-374-00	s TANTALUM 33uF 10% 16V
C282	1-131-374-00	s TANTALUM 33uF 10% 16V
C284	1-131-347-00	s TANTALUM 1uF 10% 35V
C285	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C286	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C287	1-126-320-11	s ELECT, NONPOLAR 10uF 20% 16V
C289	1-131-377-00	s TANTALUM 10uF 10% 10V
C290	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C291	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C300	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C301	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C302	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C303	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C304	1-124-229-00	s ELECT 33uF 20% 10V
C308	1-126-157-11	s ELECT 10uF 20% 16V
C309	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C310	1-131-341-00	s TANTALUM 0.1uF 10% 35V
C311	1-163-263-11	s CERAMIC 330PF 5% 50V
C312	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C313	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C314	1-131-341-00	s TANTALUM 0.1uF 10% 35V
C315	1-131-370-00	s TANTALUM 6.8uF 10% 16V
C316	1-126-157-11	s ELECT 10uF 20% 16V
C317	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C318	1-163-235-11	s CERAMIC 22PF 5% 50V
C320	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C321	1-131-341-00	s TANTALUM 0.1uF 10% 35V

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C322	1-126-157-11	s ELECT 10uF 20% 16V
C323	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C324	1-131-370-00	s TANTALUM 6.8uF 10% 16V
C325	1-163-235-11	s CERAMIC 22PF 5% 50V
C326	1-131-377-00	s TANTALUM 10uF 10% 10V
C327	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C328	1-126-157-11	s ELECT 10uF 20% 16V
C329	1-163-251-11	s CERAMIC 100PF 5% 50V
C330	1-126-153-11	s ELECT 22uF 20% 6.3V
C331	1-124-472-11	s ELECT 470uF 20% 10V
C332	1-126-157-11	s ELECT 10uF 20% 16V
C333	1-163-251-11	s CERAMIC 100PF 5% 50V
C334	1-126-153-11	s ELECT 22uF 20% 6.3V
C335	1-124-584-00	s ELECT 100uF 20% 10V
C336	1-126-157-11	s ELECT 10uF 20% 16V
C337	1-163-251-11	s CERAMIC 100PF 5% 50V
C338	1-126-153-11	s ELECT 22uF 20% 6.3V
C339	1-124-472-11	s ELECT 470uF 20% 10V
C340	1-126-320-11	s ELECT, NONPOLAR 10uF 20% 16V
C341	1-131-365-00	s TANTALUM 10uF 10% 20V
C401	1-124-589-11	s ELECT 47uF 20% 16V
C402	1-126-154-11	s ELECT 47uF 20% 6.3V
C403	1-107-202-00	s MICA 10PF 5% 500V
C405	1-107-206-00	s MICA 15PF 5% 500V
C406	1-131-377-00	s TANTALUM 10uF 10% 10V
C407	1-131-365-00	s TANTALUM 10uF 10% 20V
C408	1-107-044-00	s MICA 3.3PF 500V
C409	1-107-202-00	s MICA 10PF 5% 500V
C410	1-124-584-00	s ELECT 100uF 20% 10V
C411	1-124-584-00	s ELECT 100uF 20% 10V
C412	1-124-589-11	s ELECT 47uF 20% 16V
C413	1-124-589-11	s ELECT 47uF 20% 16V
C419	1-131-363-00	s TANTALUM 4.7uF 10% 20V
C420	1-163-251-11	s CERAMIC 100PF 5% 50V
C421	1-131-379-00	s TANTALUM 22uF 10% 10V
C422	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C423	1-126-157-11	s ELECT 10uF 20% 16V
C424	1-126-157-11	s ELECT 10uF 20% 16V
C425	1-107-048-00	s MICA 6.8PF 500V
C426	1-124-234-00	s ELECT 22uF 20% 16V
C427	1-126-157-11	s ELECT 10uF 20% 16V
C428	1-126-157-11	s ELECT 10uF 20% 16V
C429	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C430	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C431	1-107-167-00	s MICA 75PF 5% 50V
C432	1-107-167-00	s MICA 75PF 5% 50V
C433	1-126-157-11	s ELECT 10uF 20% 16V
C434	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C437	1-126-157-11	s ELECT 10uF 20% 16V
C438	1-164-232-11	s CERAMIC, CHIP 0.01uF 10% 50V
C439	1-126-157-11	s ELECT 10uF 20% 16V
C442	1-163-235-11	s CERAMIC 22PF 5% 50V
C443	1-124-234-00	s ELECT 22uF 20% 16V
C444	1-131-363-00	s TANTALUM 4.7uF 10% 20V
C445	1-163-251-11	s CERAMIC 100PF 5% 50V
C446	1-131-379-00	s TANTALUM 22uF 10% 10V
C447	1-124-234-00	s ELECT 22uF 20% 16V
C449	1-124-234-00	s ELECT 22uF 20% 16V
C450	1-163-251-11	s CERAMIC 100PF 5% 50V

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C550	1-131-374-00	s TANTALUM 33uF 10% 16V
C551	1-131-374-00	s TANTALUM 33uF 10% 16V
C552	1-131-347-00	s TANTALUM 1uF 10% 35V
C553	1-131-370-00	s TANTALUM 6.8uF 10% 16V
CN1	1-506-477-11	s CONNECTOR, 12P, MALE
CN2	1-506-703-11	o CONNECTOR POST HEADER, ILG (4P)
CN101	1-506-469-11	s CONNECTOR, 4P, MALE
CN102	1-506-468-11	s CONNECTOR, 3P, MALE
CN103	1-506-473-11	s CONNECTOR, 8P, MALE
CN104	1-506-473-11	s CONNECTOR, 8P, MALE
CN105	1-506-473-11	s CONNECTOR, 8P, MALE
CN106	1-506-474-11	s CONNECTOR, 9P, MALE
CN201	1-506-467-11	s CONNECTOR, 2P, MALE
CN202	1-506-473-11	s CONNECTOR, 8P, MALE
CN203	1-506-471-11	s CONNECTOR, 6P, MALE
CN301	1-506-474-11	s CONNECTOR, 9P, MALE
CN302	1-506-475-11	s CONNECTOR, 10P, MALE
CN303	1-506-470-11	s CONNECTOR, 5P, MALE
CN304	1-506-471-11	s CONNECTOR, 6P, MALE
CP2	1-527-585-00	s VCO, CRYSTAL 17.734475MHz
CV1	1-141-301-11	s CAP, CERAMIC TRIMMER 35P
CV2	1-141-291-11	s CAP, CERAMIC TRIMMER
CV3	1-141-291-11	s CAP, CERAMIC TRIMMER
D1	8-719-800-76	s DIODE 1SS226
D101	8-719-800-76	s DIODE 1SS226
D102	8-719-800-76	s DIODE 1SS226
D103	8-719-400-18	s DIODE MA152WK
D104	8-719-400-18	s DIODE MA152WK
D105	8-719-800-76	s DIODE 1SS226
D106	8-719-800-76	s DIODE 1SS226
D107	8-719-800-76	s DIODE 1SS226
D108	8-719-104-34	s DIODE 1S2836
D109	8-719-800-76	s DIODE 1SS226
D112	8-719-800-76	s DIODE 1SS226
D113	8-719-800-76	s DIODE 1SS226
D114	8-719-800-76	s DIODE 1SS226
D115	8-719-104-34	s DIODE 1S2836
D122	8-719-104-34	s DIODE 1S2836
D201	8-719-800-76	s DIODE 1SS226
D202	8-719-800-76	s DIODE 1SS226
D203	8-719-800-76	s DIODE 1SS226
DL1	1-415-591-11	s DELAY LINE, ULTRA SONIC
DL2	1-415-837-11	s DELAY LINE 130nS
DL3	1-415-433-11	s DELAY LINE 30nS
DL4	1-415-838-11	s DELAY LINE
DL5	1-415-433-11	s DELAY LINE 30nS
DL6	1-415-433-11	s DELAY LINE 30nS
DL101	1-415-304-21	s DELAY LINE (Y)
FL1	1-235-181-00	s FILTER, BANDPASS 4.43MHz
IC1	8-759-981-51	s IC RC1496M
IC2	8-759-030-16	s IC MC34182M
IC3	8-759-300-71	s IC HD14053BFP
IC4	8-759-300-71	s IC HD14053BFP
IC5	8-759-981-51	s IC RC1496M
IC6	8-758-150-00	s IC CX-815
IC7	8-759-981-51	s IC RC1496M

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

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Ref. No. or Q'ty	Part No.	SP Description
IC8	8-759-300-71	s IC HD14053BFP
IC101	8-759-009-02	s IC MC14046BF
IC102	8-759-907-81	s IC SN74LS221NS
IC103	8-759-100-94	s IC UPC358G2
IC104	8-759-101-12	s IC UPC311G2
IC105	8-759-200-67	s IC TC4001BF
IC106	8-759-008-76	s IC MC14006BF
IC107	8-759-200-90	s IC TC4538BF
IC108	8-759-200-90	s IC TC4538BF
IC109	8-759-239-58	s IC TC74HC221AF
IC113	8-759-207-74	s IC TC4030BFHB
IC114	8-759-008-83	s IC MC14014BF
IC115	8-759-300-71	s IC HD14053BFP
IC116	8-752-335-47	s IC CXD1216M
IC119	8-759-300-71	s IC HD14053BFP
IC120	8-759-300-71	s IC HD14053BFP
IC121	8-759-009-10	s IC MC14069UBF
IC125	8-759-143-95	s IC uPD74HC221AGS
IC126	8-759-100-94	s IC UPC358G2
IC127	8-759-902-88	s IC SN74LS123NS
IC128	8-759-929-21	s IC TLC27L2CPS
IC132	8-759-100-94	s IC UPC358G2
IC201	8-759-906-59	s IC CX22017
IC202	8-759-009-10	s IC MC14069UBF
L1	1-410-478-11	s INDUCTOR 47uH
L2	1-410-478-11	s INDUCTOR 47uH
L3	1-410-478-11	s INDUCTOR 47uH
L4	1-408-358-00	s INDUCTOR 100uH
L5	1-410-509-11	s INDUCTOR 10uH
L6	1-408-170-00	s INDUCTOR 18uH
L7	1-410-470-11	s INDUCTOR 10uH
L8	1-410-470-11	s INDUCTOR 10uH
L9	1-410-470-11	s INDUCTOR 10uH
L10	1-410-470-11	s INDUCTOR 10uH
L11	1-410-478-11	s INDUCTOR 47uH
L12	1-410-478-11	s INDUCTOR 47uH
L13	1-410-478-11	s INDUCTOR 47uH
L14	1-410-476-11	s INDUCTOR 33uH
L15	1-410-476-11	s INDUCTOR 33uH
L16	1-408-429-00	s INDUCTOR 470uH
L17	1-410-478-11	s INDUCTOR 47uH
L18	1-410-478-11	s INDUCTOR 47uH
L19	1-408-408-00	s INDUCTOR 8.2uH
L20	1-410-470-11	s INDUCTOR 10uH
L22	1-408-397-00	s INDUCTOR 1uH
L23	1-408-399-00	s INDUCTOR 1.5uH
L101	1-410-470-11	s INDUCTOR 10uH
L102	1-410-470-11	s INDUCTOR 10uH
L103	1-410-478-11	s INDUCTOR 47uH
L104	1-410-478-11	s INDUCTOR 47uH
L105	1-410-478-11	s INDUCTOR 47uH
L106	1-410-476-11	s INDUCTOR 33uH
L107	1-410-478-11	s INDUCTOR 47uH
L108	1-408-421-00	s INDUCTOR 100uH
L109	1-410-478-11	s INDUCTOR 47uH
L111	1-410-478-11	s INDUCTOR 47uH
L112	1-410-478-11	s INDUCTOR 47uH
L114	1-410-470-11	s INDUCTOR 10uH
L115	1-410-470-11	s INDUCTOR 10uH

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Ref. No. or Q'ty	Part No.	SP Description
L117	1-410-470-11	s INDUCTOR 10uH
L118	1-410-470-11	s INDUCTOR 10uH
L119	1-410-478-11	s INDUCTOR 47uH
L120	1-410-478-11	s INDUCTOR 47uH
L121	1-410-478-11	s INDUCTOR 47uH
L122	1-410-478-11	s INDUCTOR 47uH
L124	1-410-470-11	s INDUCTOR 10uH
L201	1-410-470-11	s INDUCTOR 10uH
L202	1-410-470-11	s INDUCTOR 10uH
L203	1-408-413-00	s INDUCTOR 22uH
L204	1-408-413-00	s INDUCTOR 22uH
L205	1-408-413-00	s INDUCTOR 22uH
L206	1-408-413-00	s INDUCTOR 22uH
L207	1-408-427-00	s INDUCTOR 330uH
L208	1-410-478-11	s INDUCTOR 47uH
L209	1-410-478-11	s INDUCTOR 47uH
L210	1-410-478-11	s INDUCTOR 47uH
L211	1-408-427-00	s INDUCTOR 330uH
L212	1-410-478-11	s INDUCTOR 47uH
L213	1-408-413-00	s INDUCTOR 22uH
L214	1-410-478-11	s INDUCTOR 47uH
LV1	1-408-844-00	s INDUCTOR, VAR, 22uH
Q1	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q2	8-729-100-66	s TRANSISTOR 2SC1623
Q4	8-729-122-63	s TRANSISTOR 2SA1226
Q5	8-729-122-63	s TRANSISTOR 2SA1226
Q6	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q7	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q8	8-729-122-63	s TRANSISTOR 2SA1226
Q9	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q10	8-729-122-63	s TRANSISTOR 2SA1226
Q11	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q12	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q13	8-729-109-44	s TRANSISTOR 2SK94
Q14	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q15	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q16	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q17	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q18	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q19	8-729-100-66	s TRANSISTOR 2SC1623
Q20	8-729-100-66	s TRANSISTOR 2SC1623
Q21	8-729-100-66	s TRANSISTOR 2SC1623
Q22	8-729-216-22	s TRANSISTOR 2SA1162
Q23	8-729-100-66	s TRANSISTOR 2SC1623
Q24	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q25	8-729-100-66	s TRANSISTOR 2SC1623
Q26	8-729-100-66	s TRANSISTOR 2SC1623
Q27	8-729-100-66	s TRANSISTOR 2SC1623
Q28	8-729-100-66	s TRANSISTOR 2SC1623
Q29	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q30	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q31	8-729-122-63	s TRANSISTOR 2SA1226
Q32	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q33	8-729-122-63	s TRANSISTOR 2SA1226
Q34	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q35	8-729-175-72	s TRANSISTOR 2SC2757-T33
Q36	8-729-109-44	s TRANSISTOR 2SK94

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
Q37	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q38	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q39	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q40	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q41	8-729-100-66 s	TRANSISTOR 2SC1623
Q42	8-729-100-66 s	TRANSISTOR 2SC1623
Q43	8-729-216-22 s	TRANSISTOR 2SA1162
Q44	8-729-100-66 s	TRANSISTOR 2SC1623
Q45	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q50	8-729-100-66 s	TRANSISTOR 2SC1623
Q51	8-729-100-66 s	TRANSISTOR 2SC1623
Q52	8-729-100-66 s	TRANSISTOR 2SC1623
Q53	8-729-100-66 s	TRANSISTOR 2SC1623
Q54	8-729-100-66 s	TRANSISTOR 2SC1623
Q55	8-729-100-66 s	TRANSISTOR 2SC1623
Q56	8-729-100-66 s	TRANSISTOR 2SC1623
Q57	8-729-100-66 s	TRANSISTOR 2SC1623
Q58	8-729-100-66 s	TRANSISTOR 2SC1623
Q59	8-729-104-45 s	TRANSISTOR 2SJ44-M1
Q60	8-729-100-66 s	TRANSISTOR 2SC1623
Q61	8-729-100-66 s	TRANSISTOR 2SC1623
Q62	8-729-122-63 s	TRANSISTOR 2SA1226
Q63	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q64	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q65	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q66	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q67	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q68	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q69	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q70	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q71	8-729-122-63 s	TRANSISTOR 2SA1226
Q72	8-729-122-63 s	TRANSISTOR 2SA1226
Q73	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q74	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q75	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q78	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q79	8-729-100-66 s	TRANSISTOR 2SC1623
Q80	8-729-100-66 s	TRANSISTOR 2SC1623
Q81	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q82	8-729-216-22 s	TRANSISTOR 2SA1162
Q83	8-729-216-22 s	TRANSISTOR 2SA1162
Q84	8-729-100-66 s	TRANSISTOR 2SC1623
Q85	8-729-216-22 s	TRANSISTOR 2SA1162
Q86	8-729-100-66 s	TRANSISTOR 2SC1623
Q87	8-729-216-22 s	TRANSISTOR 2SA1162
Q88	8-729-100-66 s	TRANSISTOR 2SC1623
Q89	8-729-216-22 s	TRANSISTOR 2SA1162
Q90	8-729-216-22 s	TRANSISTOR 2SA1162
Q91	8-729-100-66 s	TRANSISTOR 2SC1623
Q92	8-729-216-22 s	TRANSISTOR 2SA1162
Q93	8-729-100-66 s	TRANSISTOR 2SC1623
Q101	8-729-100-66 s	TRANSISTOR 2SC1623
Q102	8-729-216-22 s	TRANSISTOR 2SA1162
Q103	8-729-119-78 s	TRANSISTOR 2SC2603-E
Q104	8-729-100-66 s	TRANSISTOR 2SC1623
Q105	8-729-100-66 s	TRANSISTOR 2SC1623
Q106	8-729-216-22 s	TRANSISTOR 2SA1162
Q107	8-729-216-22 s	TRANSISTOR 2SA1162
Q108	8-729-175-72 s	TRANSISTOR 2SC2757-T33

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
Q109	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q110	8-729-100-66 s	TRANSISTOR 2SC1623
Q111	8-729-122-63 s	TRANSISTOR 2SA1226
Q112	8-729-100-66 s	TRANSISTOR 2SC1623
Q113	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q114	8-729-122-63 s	TRANSISTOR 2SA1226
Q115	8-729-122-63 s	TRANSISTOR 2SA1226
Q116	8-729-100-66 s	TRANSISTOR 2SC1623
Q117	8-729-216-22 s	TRANSISTOR 2SA1162
Q118	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q119	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q120	8-729-122-63 s	TRANSISTOR 2SA1226
Q121	8-729-122-63 s	TRANSISTOR 2SA1226
Q122	8-729-122-63 s	TRANSISTOR 2SA1226
Q123	8-729-109-44 s	TRANSISTOR 2SK94
Q125	8-729-122-63 s	TRANSISTOR 2SA1226
Q126	8-729-100-66 s	TRANSISTOR 2SC1623
Q127	8-729-100-66 s	TRANSISTOR 2SC1623
Q128	8-729-100-66 s	TRANSISTOR 2SC1623
Q129	8-729-100-66 s	TRANSISTOR 2SC1623
Q130	8-729-100-66 s	TRANSISTOR 2SC1623
Q131	8-729-216-22 s	TRANSISTOR 2SA1162
Q132	8-729-109-44 s	TRANSISTOR 2SK94
Q133	8-729-100-66 s	TRANSISTOR 2SC1623
Q134	8-729-216-22 s	TRANSISTOR 2SA1162
Q135	8-729-175-72 s	TRANSISTOR 2SC2757-T33
Q136	8-729-122-63 s	TRANSISTOR 2SA1226
Q137	8-729-100-66 s	TRANSISTOR 2SC1623
Q138	8-729-100-66 s	TRANSISTOR 2SC1623
Q139	8-729-100-66 s	TRANSISTOR 2SC1623
Q140	8-729-216-22 s	TRANSISTOR 2SA1162
Q141	8-729-100-66 s	TRANSISTOR 2SC1623
Q142	8-729-100-66 s	TRANSISTOR 2SC1623
Q143	8-729-216-22 s	TRANSISTOR 2SA1162
Q144	8-729-100-66 s	TRANSISTOR 2SC1623
Q145	8-729-100-66 s	TRANSISTOR 2SC1623
Q146	8-729-216-22 s	TRANSISTOR 2SA1162
Q152	8-729-100-66 s	TRANSISTOR 2SC1623
Q153	8-729-100-66 s	TRANSISTOR 2SC1623
Q154	8-729-216-22 s	TRANSISTOR 2SA1162
Q156	8-729-216-22 s	TRANSISTOR 2SA1162
Q157	8-729-100-66 s	TRANSISTOR 2SC1623
Q201	8-729-216-22 s	TRANSISTOR 2SA1162
Q202	8-729-216-22 s	TRANSISTOR 2SA1162
Q203	8-729-100-66 s	TRANSISTOR 2SC1623
Q204	8-729-216-22 s	TRANSISTOR 2SA1162
Q205	8-729-100-66 s	TRANSISTOR 2SC1623
Q206	8-729-216-22 s	TRANSISTOR 2SA1162
Q207	8-729-100-66 s	TRANSISTOR 2SC1623
Q208	8-729-100-66 s	TRANSISTOR 2SC1623
Q209	8-729-216-22 s	TRANSISTOR 2SA1162
Q210	8-729-100-66 s	TRANSISTOR 2SC1623
Q211	8-729-216-22 s	TRANSISTOR 2SA1162
Q212	8-729-100-66 s	TRANSISTOR 2SC1623
Q213	8-729-216-22 s	TRANSISTOR 2SA1162
Q214	8-729-100-66 s	TRANSISTOR 2SC1623
Q215	8-729-100-66 s	TRANSISTOR 2SC1623
Q216	8-729-216-22 s	TRANSISTOR 2SA1162
Q217	8-729-100-66 s	TRANSISTOR 2SC1623

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
Q218	8-729-216-22	s TRANSISTOR 2SA1162
Q219	8-729-100-66	s TRANSISTOR 2SC1623
Q220	8-729-100-66	s TRANSISTOR 2SC1623
Q221	8-729-100-66	s TRANSISTOR 2SC1623
Q222	8-729-216-22	s TRANSISTOR 2SA1162
Q223	8-729-216-22	s TRANSISTOR 2SA1162
Q224	8-729-100-66	s TRANSISTOR 2SC1623
Q225	8-729-100-66	s TRANSISTOR 2SC1623
Q226	8-729-100-66	s TRANSISTOR 2SC1623
Q227	8-729-100-66	s TRANSISTOR 2SC1623
Q228	8-729-100-66	s TRANSISTOR 2SC1623
Q229	8-729-216-22	s TRANSISTOR 2SA1162
Q230	8-729-100-66	s TRANSISTOR 2SC1623
Q231	8-729-216-22	s TRANSISTOR 2SA1162
Q232	8-729-100-66	s TRANSISTOR 2SC1623
Q233	8-729-100-66	s TRANSISTOR 2SC1623
Q234	8-729-100-66	s TRANSISTOR 2SC1623
Q235	8-729-216-22	s TRANSISTOR 2SA1162
Q236	8-729-216-22	s TRANSISTOR 2SA1162
Q237	8-729-216-22	s TRANSISTOR 2SA1162
Q238	8-729-100-66	s TRANSISTOR 2SC1623
Q239	8-729-100-66	s TRANSISTOR 2SC1623
Q240	8-729-216-22	s TRANSISTOR 2SA1162
Q241	8-729-100-66	s TRANSISTOR 2SC1623
R4	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R5	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R11	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R12	1-216-662-11	s METAL, CHIP 3K 0.5% 1/10W
R13	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W
R14	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R17	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R19	1-216-641-11	s METAL, CHIP 390 0.5% 1/10W
R20	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R30	1-216-657-11	s METAL, CHIP 1.8K 0.5% 1/10W
R39	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R40	1-216-620-11	s METAL, CHIP 51 0.5% 1/10W
R41	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R42	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R43	1-216-606-11	s METAL 13 0.50% 1/10W
R44	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W
R45	1-216-642-11	s METAL, CHIP 430 0.5% 1/10W
R46	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R47	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R53	1-216-643-11	s METAL, CHIP 470 0.5% 1/10W
R54	1-216-643-11	s METAL, CHIP 470 0.5% 1/10W
R55	1-216-656-11	s METAL, CHIP 1.6K 0.5% 1/10W
R58	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R59	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R64	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R66	1-216-748-11	s METAL, CHIP 39K 1% 1/10W
R83	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R84	1-216-619-11	s METAL, CHIP 47 0.5% 1/10W
R87	1-216-647-11	s METAL, CHIP 680 0.5% 1/10W
R99	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R119	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R122	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R123	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R128	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R143	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W

(SG-198P BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R147	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R157	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R158	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R206	1-216-634-11	s METAL, CHIP 200 0.5% 1/10W
R213	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R214	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R220	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R221	1-216-640-11	s METAL, CHIP 360 0.5% 1/10W
R303	1-216-022-00	s METAL, CHIP 75 5% 1/10W
R318	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R321	1-216-654-11	s METAL, CHIP 1.3K 0.5% 1/10W
R322	1-216-672-11	s METAL, CHIP 7.5K 0.5% 1/10W
R334	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R335	1-216-657-11	s METAL, CHIP 1.8K 0.5% 1/10W
R337	1-216-652-11	s METAL, CHIP 1.1K 0.5% 1/10W
R343	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R351	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R352	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R363	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R364	1-216-683-11	s METAL, CHIP 22K 0.5% 1/10W
R379	1-216-691-11	s METAL, CHIP 47K 0.5% 1/10W
R382	1-216-674-11	s METAL, CHIP 9.1K 0.5% 1/10W
R383	1-216-685-11	s METAL, CHIP 27K 0.5% 1/10W
R384	1-216-681-11	s METAL, CHIP 18K 0.5% 1/10W
R385	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R386	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R413	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W
R414	1-216-665-11	s METAL, CHIP 3.9K 0.5% 1/10W
R432	1-216-623-11	s METAL, CHIP 68 0.5% 1/10W
R445	1-216-671-11	s METAL, CHIP 6.8K 0.5% 1/10W
R446	1-216-686-11	s METAL, CHIP 30K 0.5% 1/10W
R448	1-216-676-11	s METAL, CHIP 11K 0.5% 1/10W
R449	1-216-670-11	s METAL, CHIP 6.2K 0.5% 1/10W
R450	1-216-676-11	s METAL, CHIP 11K 0.5% 1/10W
R453	1-216-686-11	s METAL, CHIP 30K 0.5% 1/10W
R455	1-216-685-11	s METAL, CHIP 27K 0.5% 1/10W
R460	1-216-675-11	s METAL, CHIP 10K 0.5% 1/10W
R461	1-216-687-11	s METAL, CHIP 33K 0.5% 1/10W
R462	1-216-683-11	s METAL, CHIP 22K 0.5% 1/10W
R471	1-249-385-11	s CARBON 2.2 5% 1/4W
R472	1-249-385-11	s CARBON 2.2 5% 1/4W
R474	1-215-394-00	s METAL 75 1% 1/6W
R480	1-249-385-11	s CARBON 2.2 5% 1/4W
R481	1-249-385-11	s CARBON 2.2 5% 1/4W
R484	1-215-394-00	s METAL 75 1% 1/6W
R489	1-249-385-11	s CARBON 2.2 5% 1/4W
R490	1-249-385-11	s CARBON 2.2 5% 1/4W
R493	1-215-394-00	s METAL 75 1% 1/6W
R525	1-216-695-11	s METAL, CHIP 68K 0.5% 1/10W
R529	1-216-022-00	s METAL, CHIP 75 5% 1/10W
R538	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R539	1-216-683-11	s METAL, CHIP 22K 0.5% 1/10W
R601	1-218-254-11	s METAL, CHIP 2.55K 0.5% 1/10W
R602	1-218-257-11	s METAL, CHIP 4.99K 0.5% 1/10W
R603	1-218-259-11	s METAL, CHIP 13.7K 0.5% 1/10W
R610	1-216-664-11	s METAL, CHIP 3.6K 0.5% 1/10W
R611	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R612	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R616	1-216-659-11	s METAL, CHIP 2.2K 0.5% 1/10W

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

(SG-198P BOARD)

Ref. No. or Q' ty	Part No.	SP Description
R617	1-216-668-11	s METAL, CHIP 5.1K 0.5% 1/10W
R618	1-216-683-11	s METAL, CHIP 22K 0.5% 1/10W
R619	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R620	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R631	1-216-657-11	s METAL, CHIP 1.8K 0.5% 1/10W
R633	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R634	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R636	1-216-657-11	s METAL, CHIP 1.8K 0.5% 1/10W
R640	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R641	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R642	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R643	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R645	1-218-254-11	s METAL, CHIP 2.55K 0.5% 1/10W
R646	1-218-259-11	s METAL, CHIP 13.7K 0.5% 1/10W
R647	1-216-651-11	s METAL, CHIP 1K 0.5% 1/10W
R648	1-216-651-11	s METAL, CHIP 1K 0.5% 1/10W
R652	1-216-658-11	s METAL, CHIP 2K 0.5% 1/10W
R654	1-216-658-11	s METAL, CHIP 2K 0.5% 1/10W
R660	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R661	1-216-684-11	s METAL, CHIP 24K 0.5% 1/10W
R662	1-216-678-11	s METAL, CHIP 13K 0.5% 1/10W
R665	1-216-651-11	s METAL, CHIP 1K 0.5% 1/10W
R666	1-216-651-11	s METAL, CHIP 1K 0.5% 1/10W
R667	1-216-665-11	s METAL, CHIP 3.9K 0.5% 1/10W
R674	1-216-624-11	s METAL, CHIP 75 0.5% 1/10W
R678	1-218-254-11	s METAL, CHIP 2.55K 0.5% 1/10W
R679	1-218-257-11	s METAL, CHIP 4.99K 0.5% 1/10W
R683	1-216-655-11	s METAL, CHIP 1.5K 0.5% 1/10W
R687	1-216-655-11	s METAL, CHIP 1.5K 0.5% 1/10W
R688	1-216-658-11	s METAL, CHIP 2K 0.5% 1/10W
R690	1-216-658-11	s METAL, CHIP 2K 0.5% 1/10W
R699	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R700	1-216-678-11	s METAL, CHIP 13K 0.5% 1/10W
R701	1-216-684-11	s METAL, CHIP 24K 0.5% 1/10W
R707	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R711	1-216-663-11	s METAL, CHIP 3.3K 0.5% 1/10W
R712	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R716	1-216-661-11	s METAL, CHIP 2.7K 0.5% 1/10W
R717	1-216-644-11	s METAL, CHIP 510 0.5% 1/10W
R718	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R720	1-216-667-11	s METAL, CHIP 4.7K 0.5% 1/10W
R750	1-216-683-11	s METAL, CHIP 22K 0.5% 1/10W
RV1	1-230-521-11	s RES, ADJ, METAL 2.2K
RV2	1-230-522-11	s RES, ADJ, METAL 4.7K
RV3	1-230-519-11	s RES, ADJ, METAL 470
RV4	1-230-519-11	s RES, ADJ, METAL 470
RV5	1-230-523-11	s RES, ADJ, METAL 10K
RV6	1-230-522-11	s RES, ADJ, METAL 4.7K
RV7	1-230-526-11	s RES, ADJ, METAL 47K
RV8	1-230-526-11	s RES, ADJ, METAL 47K
RV9	1-230-527-11	s RES, ADJ, METAL 100K
RV10	1-230-521-11	s RES, ADJ, METAL 2.2K
RV101	1-230-522-11	s RES, ADJ, METAL 4.7K
RV102	1-230-521-11	s RES, ADJ, METAL 2.2K
RV104	1-230-523-11	s RES, ADJ, METAL 10K
RV201	1-230-520-11	s RES, ADJ, METAL 1K
RV202	1-230-520-11	s RES, ADJ, METAL 1K
RV203	1-230-521-11	s RES, ADJ, METAL 2.2K

(SG-198P BOARD)

Ref. No. or Q' ty	Part No.	SP Description
RV204	1-230-521-11	s RES, ADJ, METAL 2.2K
RV205	1-230-520-11	s RES, ADJ, METAL 1K
RV206	1-230-522-11	s RES, ADJ, METAL 4.7K
RV207	1-230-523-11	s RES, ADJ, METAL 10K
RV208	1-230-519-11	s RES, ADJ, METAL 470
RV209	1-230-521-11	s RES, ADJ, METAL 2.2K
RV211	1-230-522-11	s RES, ADJ, METAL 4.7K
S1	1-553-977-00	s SWITCH, SLIDE
S2	1-572-161-11	s SWITCH, ROTARY
S3	1-572-161-11	s SWITCH, ROTARY
S101	1-553-977-00	s SWITCH, SLIDE

SW-218 BOARD

Ref. No. or Q' ty	Part No.	SP Description
1pc	1-627-158-11	o PRINTED CIRCUIT BOARD, SW-218
1pc	1-942-030-11	o HARNESS (PRI01)
1pc	1-942-033-11	o HARNESS (CT1)
D1	8-719-970-91	s DIODE GL1HS112
D2	8-719-970-40	s DIODE GL1EG11
D3	8-719-970-40	s DIODE GL1EG11
D4	8-719-970-91	s DIODE GL1HS112
D5	8-719-970-40	s DIODE GL1EG11
D6	8-719-970-91	s DIODE GL1HS112
D7	8-719-970-40	s DIODE GL1EG11
D8	8-719-970-40	s DIODE GL1EG11
D9	8-719-970-91	s DIODE GL1HS112
D10	8-719-970-91	s DIODE GL1HS112
D11	8-719-970-40	s DIODE GL1EG11
D12	8-719-970-40	s DIODE GL1EG11
D13	8-719-970-91	s DIODE GL1HS112
S1	1-554-263-11	s SWITCH, TACTILE "WHITE"
S2	1-554-263-11	s SWITCH, TACTILE "BLACK"

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

TG-35 BOARD

Ref. No. or Q'ty	Part No.	SP Description
C12	1-135-157-21 s	TANTAL 10uF 10% 6.3V
C14	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C15	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C19	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
CV1	1-141-333-11 s	CAP, CHIP TRIMMER
D2	8-719-907-19 s	DIODE, VARICAP FC52M-5
IC7	8-759-009-02 s	IC MC14046BF
IC8	8-759-032-01 s	IC MC74HC00AF
L1	1-408-147-00 s	INDUCTOR 2.2UH
Q6	8-729-109-44 s	TRANSISTOR 2SK94
Q15	8-729-100-66 s	TRANSISTOR 2SC1623

TG-108P BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	7-627-556-07 s	SCREW, PRECISION +P2. 6X2. 8
C4	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C7	1-124-584-00 s	ELECT 100uF 20% 10V
C9	1-163-103-00 s	CERAMIC, CHIP 27PF 5% 50V
C11	1-135-156-21 s	TANTAL 6.8uF 10% 6.3V
C12	1-135-156-21 s	TANTAL 6.8uF 10% 6.3V
C13	1-135-161-21 s	TANTALUM, CHIP 22uF 10% 10V
C16	1-163-011-11 s	CERAMIC, CHIP 0.0015uF 10% 50V
C19	1-163-263-11 s	CERAMIC 330PF 5% 50V
C20	1-102-959-00 s	CERAMIC 22PF 5% 50V
C21	1-163-235-11 s	CERAMIC 22PF 5% 50V
C22	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C23	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
C26	1-135-177-21 s	TANTAL 1uF 10% 20V
C27	1-135-156-21 s	TANTAL 6.8uF 10% 6.3V
C28	1-164-232-11 s	CERAMIC, CHIP 0.01uF 10% 50V
CN1	1-563-692-21 o	CONNECTOR, BOARD TO BOARD 19P
CN3	1-506-474-11 s	CONNECTOR, 9P, MALE
CN4	1-506-467-11 s	CONNECTOR, 2P, MALE
CN5	1-506-471-11 s	CONNECTOR, 6P, MALE
CN6	1-506-469-11 s	CONNECTOR, 4P, MALE
CN7	1-506-471-11 s	CONNECTOR, 6P, MALE
D1	8-719-400-18 s	DIODE MA152WK
D2	8-719-404-40 s	DIODE MA121
D3	8-719-404-40 s	DIODE MA121
IC1	8-759-941-40 s	IC CXD1084Q-W
IC2	8-752-326-69 s	IC CXD1035BQ-Z
IC3	8-759-032-01 s	IC MC74HC00AF
IC4	8-752-324-14 s	IC CXD1141M
IC5	8-759-730-38 s	IC MB7114LPF-750-P11
IC6	8-759-209-69 s	IC TC4S11F
IC7	8-759-209-69 s	IC TC4S11F
IC8	8-759-973-99 s	IC CXD1361M
IC9	8-759-209-57 s	IC TC4S69F
L1	1-410-194-51 s	INDUCTOR CHIP 1.5uH
L2	1-410-194-51 s	INDUCTOR CHIP 1.5uH
L3	1-410-194-51 s	INDUCTOR CHIP 1.5uH
L4	1-410-194-51 s	INDUCTOR CHIP 1.5uH
Q1	8-729-216-22 s	TRANSISTOR 2SA1162
Q2	8-729-402-16 s	TRANSISTOR XN4608
Q3	8-729-421-23 s	TRANSISTOR XN1216
Q4	8-729-402-81 s	TRANSISTOR XN4501
Q5	8-729-216-22 s	TRANSISTOR 2SA1162
Q6	8-729-216-22 s	TRANSISTOR 2SA1162
R2	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R22	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R24	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R25	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R26	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R27	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
R40	1-249-413-11 s	CARBON 470 5% 1/4W
R41	1-216-624-11 s	METAL, CHIP 75 0.5% 1/10W
RV1	1-228-471-00 s	RES, ADJ, METAT 1K
S1	1-571-120-11 s	SWITCH, SLIDE
S2	1-571-120-11 s	SWITCH, SLIDE

Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

FRAME

Ref. No.
or Q'ty Part No. SP Description

- △ 1-413-383-32 s REGULATOR, SWITCHING
1-466-046-14 s CONVERTER, DC-DC
1-547-312-11 s FILTER UNIT, FRONT
1-562-245-00 o CONNECTOR 26P MALE "CAMERA HEAD"

1-574-266-31 s CABLE ASSY (17 CORE)
1-562-151-11 o HOUSING, 6P
1-562-151-11 o HOUSING, 6P
1-564-183-00 s PLUG, CONNECTOR (PIN) 26P

1-580-724-11 s CONNECTOR, BNC

1-942-028-11 o HARNESS (PR2)
1-516-075-13 s SWITCH, ROTARY

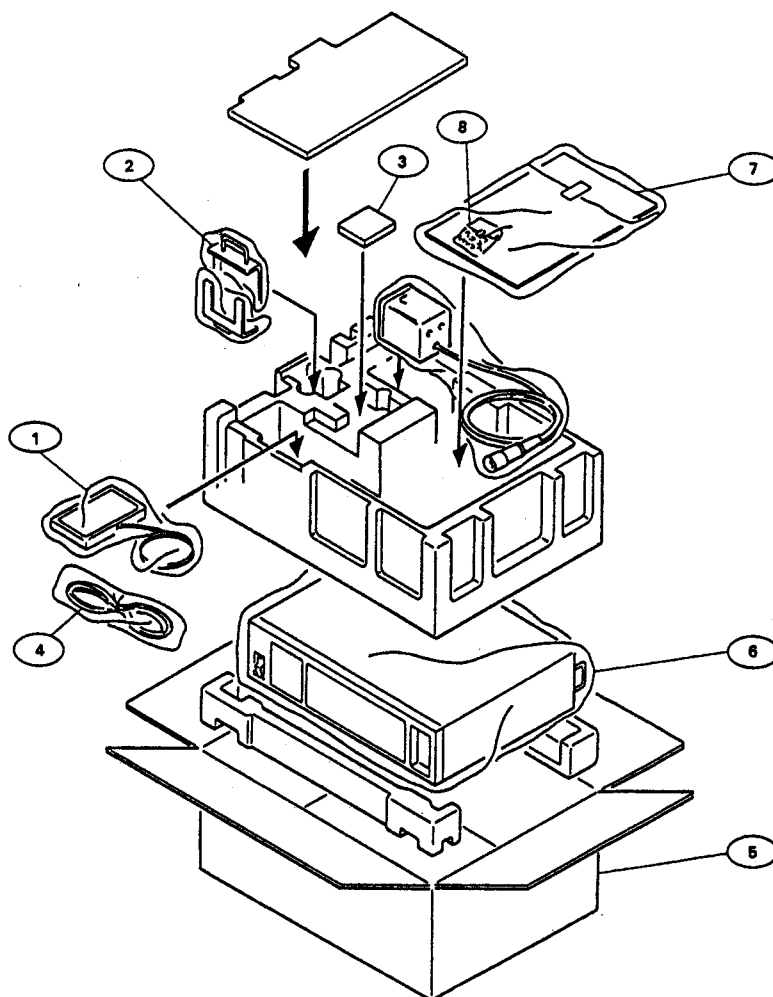
1-942-034-11 o HARNESS (PR5)
1-562-154-41 o HOUSING, 9P

1-942-035-11 o HARNESS (PR202)
1-562-151-11 o HOUSING, 6P
1-562-151-11 o HOUSING, 6P
1-562-157-11 o HOUSING, 12P
1-562-157-11 o HOUSING, 12P

7-3. PACKING MATERIAL AND ACCESSORIES

- Ref. No.
or Q'ty Part No. SP Description
- 1 A-7504-093-A o COMPLETE ASSY, TGR-750
2 X-2381-908-1 o ANGLE ASSY (INST), RACK
3 1-547-310-11 s FILTER UNIT, FRONT
2-288-928-01 o CASE, FILTER
4 △ 1-590-910-11 s CORD SET, POWER
5 3-170-073-01 o INDIVIDUAL CARTON

6 3-704-343-01 o SHEET (STANDARD), PROTECTION
7 △ 3-753-262-11 s MANUAL, INSTRUCTION
8 7-682-562-04 s SCREW +B 4X10



Please see pages 7-6 to 7-7 for the part numbers of capacitors and resistors that are not listed in the parts list.

TGR-750

SERVICE MANUAL



Title Generator
SONY®

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CHAPTER 1

OPERATION

1-1. OUTLINE

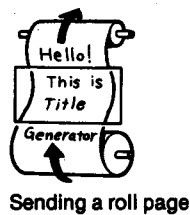
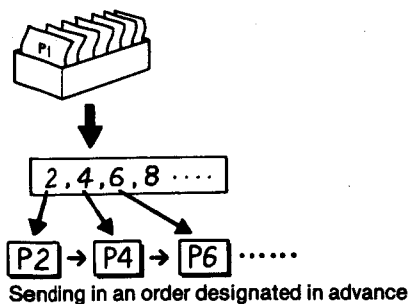
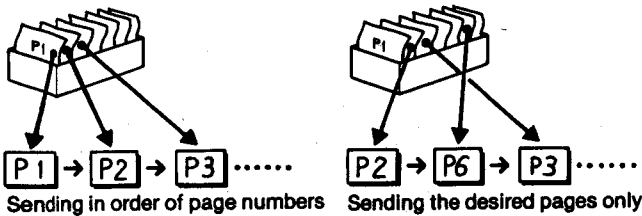
What is the Title Generator?

The title generator is a unit used to prepare title pictures (alphabet, figures and symbols) and to superimpose them on the pictures picked up by the camera. The video signal composed of the picture picked up by the camera and the picture prepared by the title generator are output from the camera control unit.

The title generator has the following features.

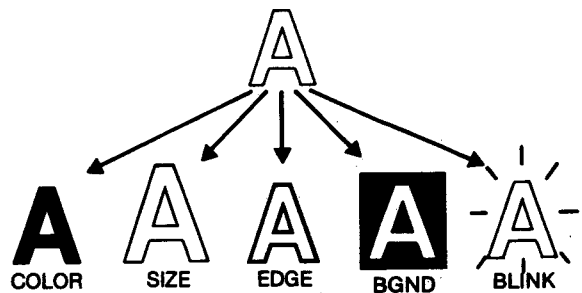
Up to 9 title pictures

Up to 9 pages of title pictures can be made and numbered. The pictures can be sent in order of page numbers or in any desired order. It is also possible to send them out in an order designated in advance (program page). Scrolling the characters upward on the screen is also possible (roll page).



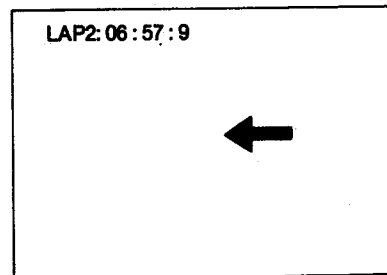
Variation of displays

Color and size of the characters can be designated page by page, and effects such as border, background color and blinking can be added to the characters. Color and blinking conditions can be designated character by character, and the size, border and background can be designated page by page.



Displaying the time, lap time and arrow mark

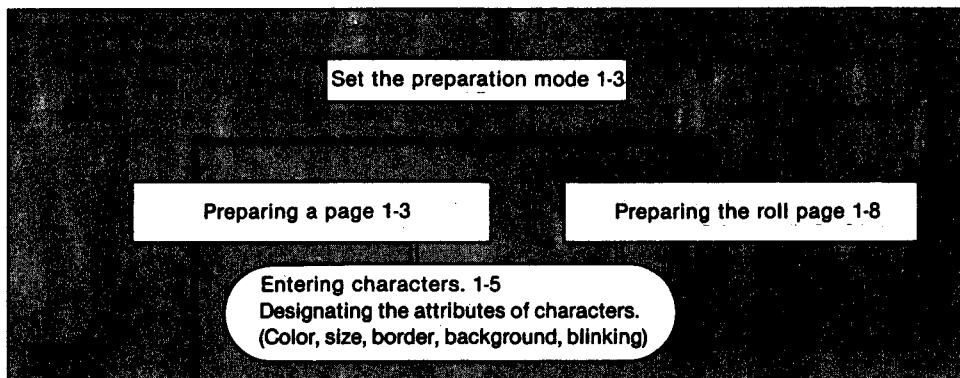
The time or lap time can be superimposed on the camera picture and title picture. The arrow mark can also be displayed, which can be moved up, down, right and left for indicating specific points on the screen.



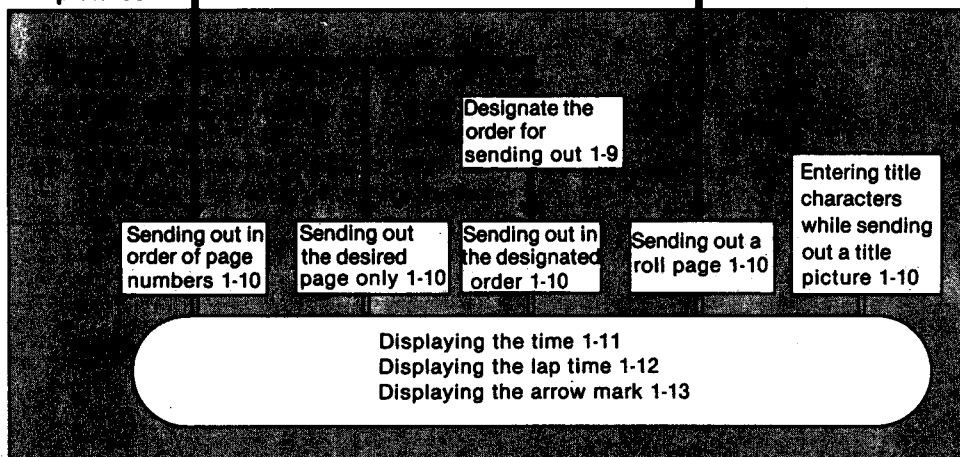
Flow Chart of Preparing and Sending out Title Pictures

For details, please refer to the page indicated by the circled number.

Preparing title pictures



Sending out title pictures



1-2. POWER SOURCES

Power Supply

The power supply to the title generator is turned on and off by the camera.

Turning the power on

- 1** Check that the title generator, monitor and other equipment are correctly connected to the camera. (Refer to DXC-755 "Connections" in Chapter 1).
- 2** Turn the power of the camera and other equipment on.
- 3** To send out the title picture, see "Sending out the title pictures" on page 1-9.
To make title pictures, see "Preparing title pictures" on page 1-4.

Note

First be sure to connect all equipment, then turn the power on.

The signal system (NTSC or PAL) of the title generator is automatically set according to the signal input from the camera, just after the power is turned on. Therefore, if the power is turned on before making the connection, correct signal system may not be set.

Turning the power off

Turn the power of the camera off.

Even if the power is turned off, title pictures, sending order and the settings of the time will be kept for about one month.

Note on the Back-up Battery

The title pictures are stored in memory. The title generator has a rechargeable back-up battery of nickel cadmium to keep the title pictures and time in memory. When the battery is fully charged, the content of memory is kept for about one month after the power is turned off. When the battery is discharged, the time becomes incorrect and the memorized title pictures are erased.

When the title generator is used for the first time, the battery may be discharged. Therefore, connect the title generator to the camera, turn the power on, and keep the power supply on for about 12 hours. While charging of the battery, the camera and title generator can be used.

1-3. PREPARING TITLE PICTURES

Prepare a title picture, designate the number for each picture (this is called the page number), and store it. A title picture moving upward on the screen (roll page) can also be made.

Setting the Unit in Preparation Mode

When the power is turned on, only the picture picked up by the camera is displayed on the monitor screen.

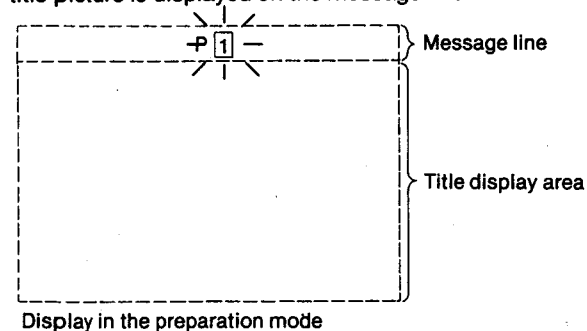
To set the unit in the mode for making a title picture (preparation mode), press the **EDIT** key.

On the monitor screen, page number "P1" is displayed and blinks.

Then you can designate the page number and make the title picture.

Composition of the screen

The monitor screen displayed by the title generator is composed of the message line and a title display area. On the message line, the time or the lap time can be superimposed on the picture picked up by the camera. When making a title picture, a message to help making a title picture is displayed on the message line.



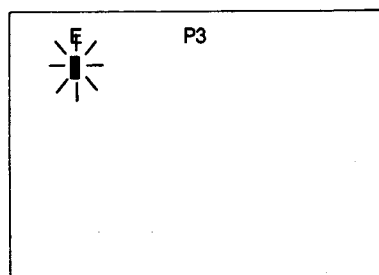
Preparing a Page

1 When the page number is blinking, designate the page number which is to be used.

Press one of the figure keys ① to ⑨ to change the "P1" (page number display) to the desired number. For example, to designate page 3, press the ③ key.

2 Press the **PAGE key.**

A sample character "E" and the designated page number are displayed.



Example when page 3 is designated.

3 Enter the title.

(For the method to enter characters, refer to "How to enter characters" in the next page.)

4 When the title picture has been made, press the **PAGE key again.**

"P3 SAVE? (Y/N)" is displayed after page 3 has been made.

5 To save the page, press the **Y key.**

The page is saved, and can be sent repeatedly.

If you do not want to save the page, press the **N key.**

The page is not saved and it cannot be sent out. The title picture made before remains in memory.

The title picture remains on the screen, and the page number starts blinking.

Repeat steps 1 through 5 to make other pages.

How to Enter Characters

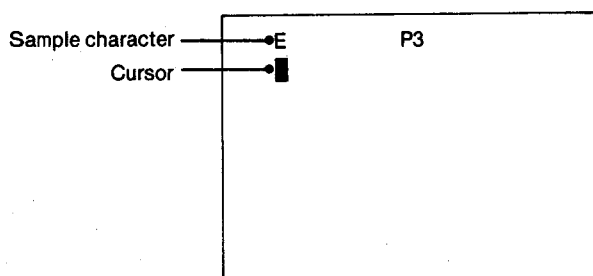
Designation of the attributes of characters (color, size, etc.), entering the characters and modification of the entered characters are described here.

Designating the attributes of characters

When the page is designated and displayed, designate the attributes of the characters. The attributes which can be designated are color, blinking condition, border, background and size. The background, border and size are designated page by page, and the color and blinking conditions can be designated character by character.

- **Designating border, background and size**
Press the **EDGE** (border), **BGND** (background) or **SIZE** keys repeatedly until the desired conditions are obtained.

The designated conditions are checked with the sample character "E", except for the size, which is checked by the size of the cursor.



Then enter the characters so that they are displayed with the designated attributes.
When the attributes are designated after entering the characters, they are also changed.

- **Designating color and blinking condition**
Press the **COLOR** or **BLINK** key repeatedly until the desired conditions are obtained.
The designated condition are checked with the sample character.
Then enter the characters so that they are displayed with the designated color and blinking condition.
The color and blinking condition can be changed at the desired position.

- **Changing color and blinking condition of the characters which have been entered**

- 1 Press the **←**, **→**, **↑**, or **↓** key to place the cursor at the character whose color or blinking condition shall be changed.
- 2 Press the **COLOR** or **BLINK** key until the desired conditions are obtained.
- 3 Press the **ENT** key.
The color and blinking conditions of the character are changed to the designated ones.

- **Displaying background color without a character**
When the **BGND** key is pressed, background color is added to the entered characters. To display only the background color, press the **ENT** key, and the background color will be displayed in the same size as the cursor without a character.



Conditions designated by the attribute keys

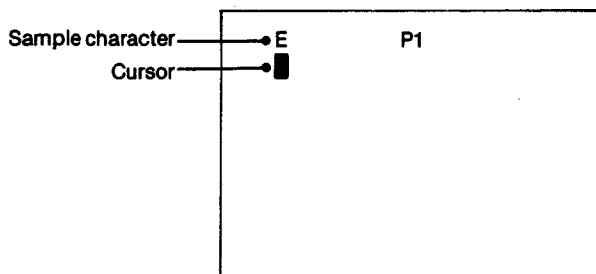
Key	Attribute	Conditions	Minimum unit
COLOR	color	White*, black, red, green, yellow, blue, magenta, cyan	1 character
BLINK	Blinking	Not blinking*, Blinking	1 character
EDGE	Border	No border*, black, red, green, yellow, blue, magenta, cyan, white	1 picture
BGND	Back-ground	No background*, black, red, green, yellow, blue, magenta, cyan	1 picture
SIZE	Size	1x1 (standard)*, 2x1, 1x2, 2x2, 3x2, 2x3, 3x3	1 picture

Notes

- * mark shows the initial settings.
- When the background is designated, the border will automatically be black.
- If the **BGND** key is pressed to add background to the character with a border, the border is removed. To add the border to the character with background added, press the **EDGE** key again.

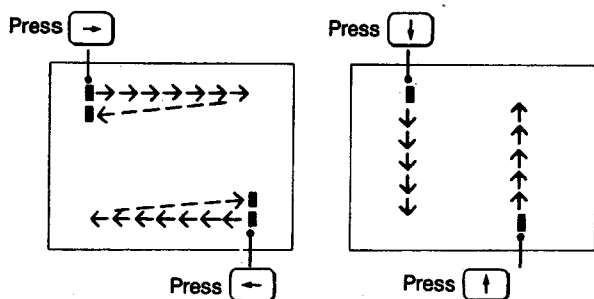
Entering characters

Designate and display the page, and a sample character "E" will be displayed at the left top of the screen. A cursor appears to indicate the position where a character is entered at the top of the title display area.



• Deciding the position for entering a character

Press the $\leftarrow$, $\rightarrow$, $\uparrow$, $\downarrow$ key to place the cursor where a character is to be entered.



• Starting a new line

When entering characters, a new line is automatically started when the end of the previous line has been reached. To start a new line when you have reached the middle of the line, press the $\downarrow$ and $\leftarrow$ keys. Pressing the ENT key does not start a new line.

• Changing capital letters to small letters (figures to symbols) and vice versa

When the power is turned on, capital letters and figures are entered by pressing the character and figure keys. At this time, "E" is displayed, as a sample character.

To enter small letters or symbols, press the SHIFT key, and the sample character changes to "e". To enter the capital letters, press the SHIFT key again.

Keys pressed	(A)	(3#)	(?)
Characters when sample character "E" is displayed	A	3	/
Characters when sample character "e" is displayed	a	#	?

• Entering a space

Press the SPC key.

Place the cursor on an entered character and press the SPC key, and the character is deleted and a space is entered.

Character size and the number of characters on a picture

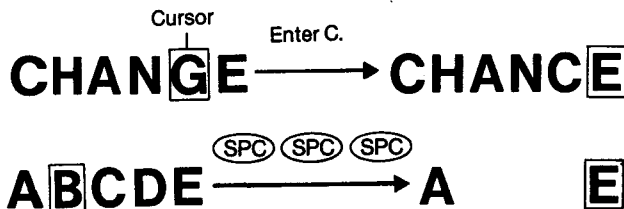
Seven sizes of characters can be selected, and the number of characters displayed on a picture depend on the character size.

Character size Horizontal and vertical ratio against the standard size	Number of characters on the picture Horizontal x Vertical (characters) (lines)	
	NTSC	PAL
Standard size: 1x1	24x9	24x9
2x1	12x9	12x9
1x2	24x5	24x6
2x2	12x5	12x6
3x2	8x5	8x6
2x3	12x3	12x4
3x3	8x3	8x4

• **Replacing the entered characters**

Press either of the , ,  and  keys to place the cursor on the character which is to be replaced, and enter a new character.

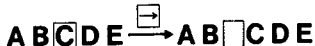
The character where the cursor is placed changes to a new character.

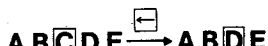


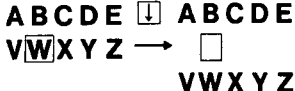
• **Inserting or deleting a character and a line**

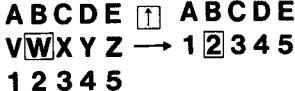
1 Press the , ,  or  key to place the cursor on the character which is to be deleted, or to the position where a character is to be inserted. To designate a line, place the cursor at any position on the line.

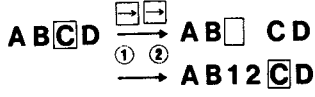
2 Press the **INS/DEL** key. "I/D" is displayed.

3 To insert a space:
Press the  key. 

To delete a character
Press the  key. 

To insert a line,
Press the  key. 

To delete a line,
Press the  key. 

To insert characters,
Press the  key so many times as the inserted characters, and enter characters. 

4 When the insertion or deletion is finished, press the **INS/DEL** key again.

When characters are pushed out of the screen

When characters are pushed out to the right end by inserting other characters, up to 5 characters in minimum character size can be memorized. When characters are pushed out below the screen, up to 3 lines in minimum character size can also be memorized. When the characters displayed on the screen are deleted, the memorized characters are displayed again on the screen.

• **Moving the whole title upward**

Press the  key to move the cursor to the uppermost position (just below the message line) in the title display area, and press the  key again.

The title and the message line move upward by 1/4 line every time the key is pressed within the range of displaying the whole data without pushing them out of the screen.

• **Moving the whole title downward**

Press the  key to move the cursor to the lowermost position in the title display area, and press the  key again.

The title and the message line move downward by 1/4 line every time the key is pressed within the range of displaying the whole data without pushing them out of the screen.

Preparing a Title Picture Moving Upward (Roll Page)

Besides ordinary title pictures, a title picture moving upward on the screen (roll page) can be made. On a roll page, the data of the amount equivalent to three pages of an ordinary title picture (27 lines) can be entered.

- 1** Press the **[EDIT]** key to make the page number blink.
- 2** Press the **[ROLL]** key.
"ROLL" is displayed, and the contents of the roll page appears.
- 3** Designate the attributes of the characters, and enter the title characters.
(For details, refer to "How to enter characters" on page 1-5.)
When characters are entered to the bottom of the screen, continue entering characters, and the following line will automatically appear until characters for 3 pages are entered.
To display the next line without entering characters, press the **[↓]** key.
When the cursor is moved to the top of the displayed area and the **[↑]** key is pressed, the previous line will be displayed.
- 4** When the roll page has been made, press the **[ROLL]** key again.
"ROLL SAVE? (Y/N)" is displayed.
- 5** To save the roll page, press the **[Y]** key, and the page is saved and can be sent repeatedly.
If you do not want to save the page, press the **[N]** key, and the page will not be saved nor sent. The contents entered before remains in memory.

The display in the title display area remains as it is, and the page number starts blinking.

Deleting a Prepared Page

- 1** Press the **[EDIT]** key to make the page number blink.
- 2** Press the figure key and the **[PAGE]** key to display the page that is to be deleted.
To delete a roll page, press the **[ROLL]** key.
- 3** Press the **[CL]** key.
"Px (or ROLL) CLEAR? (Y/N)" is displayed.
(X shows the designated page number)
- 4** To delete the page, press the **[Y]** key.
The title picture is deleted from the screen and from the memory.
"CLR Px (or ROLL)" is displayed, and the page is ready to accept new data.
The attributes of the characters are automatically set to the initial settings.
If you do not want to delete the page, press the **[N]** key.
The conditions when the page is displayed is retrieved.

1-4. SENDING OUT THE TITLE PICTURES

While monitoring the picture picked up by the camera on the monitor screen, designate the title page to be sent out. The following four methods are prepared for sending title pictures out.

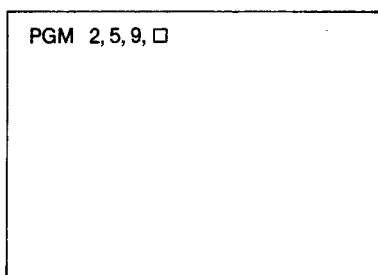
- Sending them out in the order of page numbers
- Sending out the desired pages
- Designating the order of sending, and sending them out in the designated order (program page)
- Sending out the title moving upward (roll page)

Designating the Order for Sending Out (Program Page)

To send the desired pages in the desired order, designate the order and memorize it in advance. The maximum number of pages that can be designated is 10. It is possible to designate a page repeatedly.

One page sequence can be memorized. When a new order is designated, the order designated before is automatically erased.

- 1** Press the **[EDIT]** key to make the page number blink.
- 2** Press the **[P.PAGE]** (Program PAGE) key.
"PGM" is displayed.
When the order has been designated, the designated page numbers are displayed after "PGM".
- 3** To delete the displayed page numbers, press the **[←]** key repeatedly, and the page numbers will be erased from the last one.
- 4** Designate the page numbers in the order they are sent out by pressing the figure keys (from **①** to **⑨**).
The page numbers are displayed after the "PGM".



Example when pages 2, 5 and 9 are designated.

Changing the page number

Press the **[←]** key to erase the designated number from the last page, and enter new page numbers.

- 5** When the designation is finished, press the **[P.PAGE]** key again.
The designated order is stored, and the page number starts blinking.

Setting the Sending Mode

When the power is turned on, only the picture picked up by the camera is displayed on the monitor screen, and the title picture can be sent out.

If the page number "Px" is blinking on the message line, the mode for making a title picture is set. Press the **[EDIT]** button, and the sending mode is obtained. If a title page is still displayed after pressing the **[EDIT]** key, press the **[CL]** key to erase the title picture.

Sending the Title Pictures

Press one of the following keys at the point where a title picture is to be sent out.

- **To send out in the order of page numbers, press the PAGE key.**
Page 1 is sent out. Every time the PAGE key is pressed, the consecutive page is sent out. When page 9 is sent out, pressing the PAGE key will send out page 1.
- **To send out desired pages, press the figure key (①—⑨) corresponding to the page number.**
- **To send out in the designated order, press the P.PAGE key.**
Every time the key is pressed, the pages are sent out in the designated order.
- **To send out a roll page, press the ROLL key.**
To stop sending a roll page, press the ROLL key again. To re-start sending it, press the ROLL key.

Note

When the roll page is being sent, no key other than the PAGE, P.PAGE, ROLL, figure (① to ⑨) and CL keys can work. To use the other keys, interrupt sending of the roll page by pressing the CL key.

To interrupt sending of the title picture

Press the CL key.

The title picture disappears from the screen.

When the time, lap time or arrow mark is displayed, it does not disappear. (Refer to "Displaying data other than the title picture" on page 1-11.)

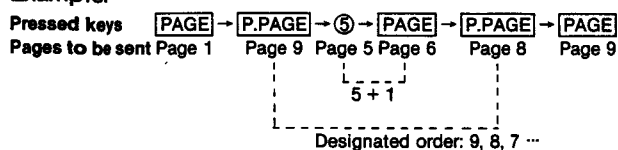
After pressing the CL key, press one of the above mentioned keys (PAGE , P.PAGE , ROLL , ①—⑨), and the page following the page last sent is sent out.

Combination of 3 methods

While sending a title picture, the sending method can be changed.

- **To start sending the page following the page being sent,**
Press the PAGE key.
- **To send title pictures in the designated order regardless of the page being sent,**
Press the P.PAGE key.
- **To send a roll page,**
Press the ROLL key. The roll page can be sent without affecting the designated order.

Example:



Note

If you release the sending mode by pressing EDIT, the next sending will start in the initial conditions. PAGE will send the page 1, and P.PAGE will send the first page of the designated order.

Entering Characters While Sending a Title Picture (Type)

While sending a title picture or displaying a picture picked up by the camera, the title picture can be modified or a new title picture can be made.

- 1 While sending a title picture or displaying a picture picked up by the camera, press the TYPE key.**
A cursor appears on the left top of the screen, and a title can be entered.
- 2 Decide the attributes of the characters, and enter the characters.** (Refer to "How to enter characters" on page 1-5.)
The entered characters are directly sent out.
The attributes of the characters can be checked with the cursor instead of the sample character.
Changing of capital letters to small letters or vice versa, or insertion or deletion of a character or a line cannot be checked because a message cannot be displayed.
- 3 When the input is finished, press the TYPE key again.**
The cursor disappears, but the display remains as it is.

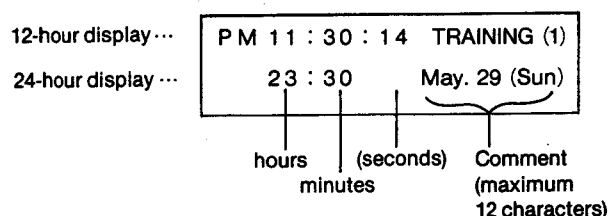
Press the CL key to interrupt sending of a title picture, or press the PAGE, P.PAGE, ROLL or figure key to send another page. The characters entered after pressing the TYPE key are not stored, and therefore they cannot be sent repeatedly. Even if the characters being sent are modified after pressing the TYPE key, the characters that have not been modified remain in memory.

1-5. DISPLAYING DATA OTHER THAN THE TITLE PICTURE

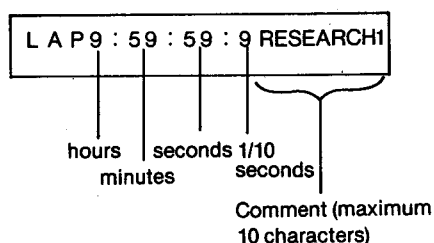
While sending the title picture or displaying a picture picked up by the camera, the time or lap time can be displayed. An arrow mark can also be displayed to indicate a desired point on the screen.

The time and the lap time are displayed at the top of the screen (message line).

Example of the time display



Example of the lap time display



Time setting and display format setting, comment input, color and blinking condition of characters are designated in the preparation mode. Only the standard size characters are displayed, and the border and background designations are the same as those of the title characters being sent out.

Time Display

While sending title pictures or displaying a picture picked up by the camera, press the **CLOCK** key. If the **CL** key is pressed to interrupt sending of the title picture, the time display remains.

To delete the time display, press the **CLOCK** key again.

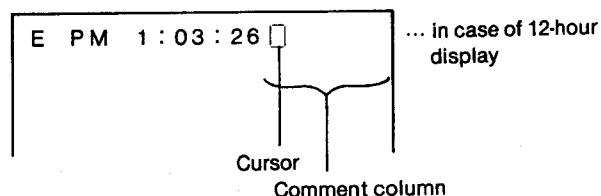
Note

While sending the roll page, the **CLOCK** key does not work.

The time is displayed based on the built-in clock. Set the clock to the correct time when the title generator is used for the first time.

- 1 When the page number is blinking in the preparation mode, or the contents of a page is displayed, press the **CLOCK** key.

The current time is displayed.



When the 24-hour display mode is selected, "*" is displayed instead of "PM".

The cursor is placed at the beginning position of the comment column.

- 2 Enter a comment if necessary.

The color and blinking condition of the comment can be designated by the **COLOR** and **BLINK** keys.

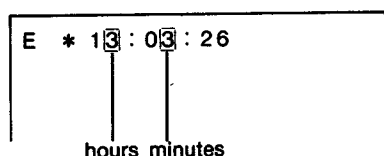
- 3 Press the **START/STOP** key.

The cursor moves to the position "PM", and the displayed clock data stops. In this condition, the clock can be set.

- 4 To change the time display mode (12-hour display/24-hour display),**
Move the cursor to the position "PM" or "*", and press the **[↑]** key.
Every time the key is pressed, the display is changed as follows;
12-hour display → 12-hour display (without second) →
24-hour display → 24-hour display (without second)
When the **[↓]** key is pressed, the displayed mode is changed in the reversed order.

Setting the clock

Move the cursor to the position of the hours or minutes whose figures are to be changed, and press the **[↑]** or **[↓]** key to change the figures.



When the figures of hours or minutes are changed, the figures for seconds are automatically changed to "00".
If the **[START/STOP]** key is pressed before changing the figures of hours and seconds, the clock returns to the condition in step 2.

Changing the color and blinking condition of the time display

- (1) Place the cursor to the character whose condition is to be changed.
If the time is 1 to 9 o'clock, no character is displayed at the place of ten. But you can change the character at this position by placing the cursor there.
- (2) Press the **[COLOR]** and **[BLINK]** keys until the sample character "E" is set to the desired condition.
- (3) Press the **[ENT]** key to change the color and blinking condition of the character where the cursor is placed.

- 5 Press the **[START/STOP]** key to start the clock, setting it to the time signal from the radio or others.**
- 6 When the time is set, press the **[CLOCK]** key again.**
The preparation mode is retrieved.

Lap Time Display

Displaying the lap time

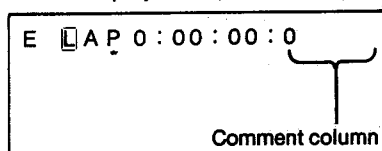
- 1 While sending title picture or displaying a picture picked up by the camera, press the **[LAP]** key.**
"LAP 00:00:00" is displayed.
If the **[CL]** key is pressed to stop the title display, the lap time display remains.
- 2 Press the **[START/STOP]** key at the point from where the lap time is to be counted.**
The lap time is counted in the unit of 1/10 second.
- 3 To check the lap time, press the **[START/STOP]** key again.**
The displayed clock data stops, but the clock operation continues.
- 4 Press the **[START/STOP]** key, and the clock data is retrieved.**
Repeat steps 3 and 4 to check the lap time.
- 5 To terminate the lap time display, press the **[LAP]** key.**
If the **[LAP]** key is pressed again, the lap time is reset to 0.

Notes

- While sending the roll page, the **[LAP]** and **[START/STOP]** keys do not work.
- If a new page is sent out while counting the lap time, the figure in the 1/10 second block momentarily stops, but the counting continues normally.

Setting the Preparation Mode

- 1 Press the **EDIT** key to set the preparation mode, and press the **LAP** key.
The lap time is displayed.



- 2 Place the cursor at the character whose color and blinking condition shall be changed.
- 3 Press the **COLOR** or **BLINK** key until sample character "E" is set to the desired conditions.
- 4 Press the **ENT** key, and the color and blinking condition of the character where the cursor is placed change.
- 5 Enter a comment if necessary (maximum 10 characters).
- 6 When the setting is finished, press the **LAP** key again.

Arrow Mark Display

- 1 While sending title picture or displaying a picture picked up by the camera, press the **⇐** key.
An arrow mark is displayed on the screen.
If the arrow mark and the title are overlapped, the arrow mark is displayed on the title.
If the **CL** key is pressed to stop sending of the title picture, the arrow mark remains displayed.
- 2 Press the **⇐**, **⇒**, **↑**, or **↓** key to move the arrow mark to the desired position.
- 3 To change the direction of the arrow head, press the **SHIFT** key, and press the cursor key which indicates the desired direction.
To retrieve the condition under which the arrow mark can be moved, press the **SHIFT** key again.
- 4 To terminate the arrow mark display, press the **⇐** key again.

Changing the attributes (color, background, border, size and blinking) of the arrow mark

When the arrow mark is displayed while sending a title picture, press the attribute keys (**COLOR**, **BGND**, **EDGE**, **SIZE** or **BLINK**).

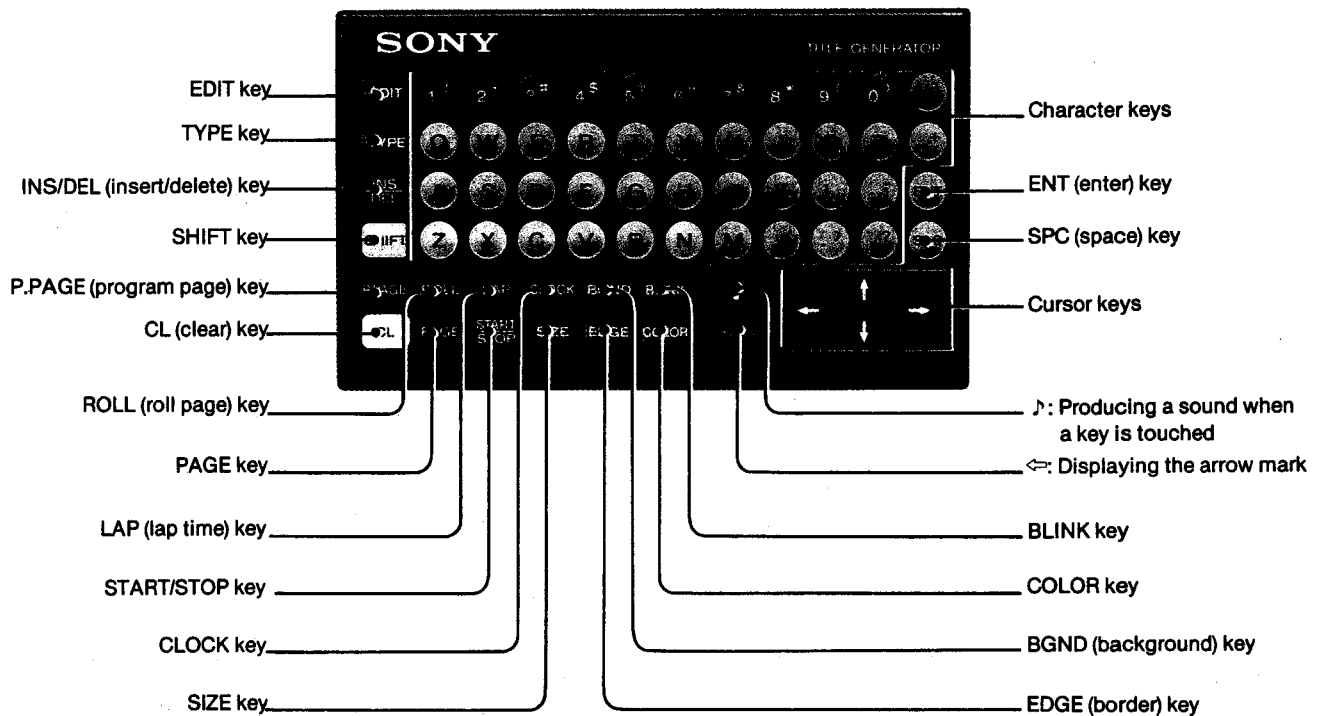
While making the title picture, the arrow mark can be displayed to check its current conditions. However the direction of the arrow head or the attributes of the arrow mark cannot be changed.

Note

While sending the roll page, the arrow mark cannot be displayed. When the arrow mark has already been displayed, the conditions of the displayed arrow mark cannot be changed.

1-6. LOCATION AND FUNCTION OF KEYS

Location of Keys



Guide of the Key Operation

Functions	Operating procedures (□, and ○ shows the keys to be pressed)
To set the mode for preparing a title page	Turn the power on (sending mode). → EDIT
Displaying a page and preparing a title picture	Preparation mode → ① - ⑨ → PAGE → Entering characters → PAGE → Y (to store) [or N (not to store)]
Displaying a roll page and preparing a title picture	Preparation mode → ROLL → Entering characters → ROLL → Y (to store) [or N (not to store)]
Deleting a page	Displaying a page (or a roll page) → CL → Y (delete) [or N (not delete)]

Functions	Operating procedures
Designating the order of pages to be sent out	Preparation mode → P.PAGE → ① - ⑨ → P.PAGE
Set the sending mode	Turn the power on. Or set the preparation mode. → EDIT
Sending out title picture in order of the page numbers	Sending mode → PAGE
Sending out the desired pages	Sending mode → ① - ⑨
Sending out title picture in the designated order	Sending mode → P.PAGE
Sending a roll page	Sending mode → ROLL
Interrupting sending of a title picture	Sending out a title picture → CL
Entering characters while sending out a title picture	Sending mode → TYPE → Entering characters → TYPE

Functions	Operating procedures	
Designating the attributes of characters		
• Designating the size	SIZE	
• Designating the background	BGND	
• Designating the border	EDGE	
• Designating the blinking condition	BLINK	
• Designating the color	COLOR	
Deciding a position to enter characters by moving a cursor	←→↑↓	
Changing capital letters to small letters and vice versa	SHIFT (capital) ↔ SHIFT (small)	
Entering a space	SPC	
Inserting or deleting a character or a line	INS/DEL	
• Inserting a space	→	→ INS/DEL (quit)
• Deleting a character	←	
• Inserting a line	↓	
• Deleting a line	↑	
Changing the color or blinking condition	Move the cursor at the character whose color or blinking condition is changed. → COLOR or BLINK → ENT	

Functions	Operating procedures
Displaying the time	Sending mode → CLOCK → CLOCK (quit)
Setting the time	Preparation mode → CLOCK → START/STOP → Place the cursor at the item whose data is changed → Change the character or figure by pressing the ↑ or ↓ → START/STOP → CLOCK
Displaying the lap time → Starting counting → Displaying the lap time and stopping the clock data display	Sending mode → LAP → START/STOP → LAP (quit) → START/STOP
Changing the lap time display condition	Preparation mode → LAP → Place the cursor at the position whose character is changed. → COLOR or BLINK → ENT → LAP
Displaying an arrow mark	Sending mode → → → (quit)
Moving an arrow mark	Displaying the arrow mark → →↑↓
Changing the direction of the arrow head	Displaying the arrow mark → SHIFT → →↑↓ → SHIFT (quit)
Producing a sound when a key is touched	→ → (quit)

Producing a Key Touch Sound

The unit can be set so that a sound can be heard every time a key is touched.

In the initial settings, a sound cannot be heard.

To produce a key touch sound, press the → key.

When the → key is pressed again, the sound cannot be heard even if a key is touched.

CHAPTER 2

SERVICE INFORMATION

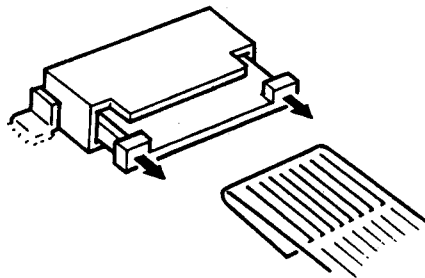
2-1. SPECIFICATION

Power requirements	DC5V (supplied from the camera control unit)
Power consumption	350mW
Input and output connector	8-pin connector
	Input:5V
	Frame grounding
	Grounding
	Composite sync
	Output:R
	G
	B
	Key signal
	2.5Vp-p (75 Ω Termination)
Operating temperature	- 5 $^{\circ}$ C ~ 45 $^{\circ}$ C (23 F to 113 F)
Storage temperature	- 40 $^{\circ}$ C ~ 60 $^{\circ}$ C
Dimensions	137x18.5x82mm (w/h/d) (5 $\frac{1}{2}$ x $\frac{3}{4}$ x 3 $\frac{1}{4}$ inches) not including the connection cable
Weight	Approx. 300g (11oz)

2-2. PRECAUTIONS ON REPAIR

Always unlock the connector when disconnecting the sheet switch. To release the lock, pull the connector in the arrow direction as shown.

(Pulling the connector in lock state can damage the carbon in lead section.)



2-3. BATTERY REPLACEMENT

A Ni-Cd battery is built in the unit to back up the memory. When the clock malfunctions or the contents of memory are cleared, charge the battery (for about 10 hours). Replace it if symptom cannot be remedied.

Connect the unit and camera, and replace the battery with the power switch on the camera turned ON, when the contents of memory are to be stored. Note that replacing the battery without connecting the unit to the camera clears all data in the memory.

Replacing procedure:

- 1) Disconnect the used battery, starting from positive (+) terminal.
- 2) Bend the lead of a new battery as shown in Figure 1, and install it on the specified position of the board, starting from negative (-) terminal.
- 3) As shown in Figure 2, place the board on upper cabinet and solder leads with battery height aligned with the groove.

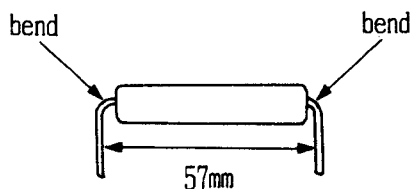


Fig.1

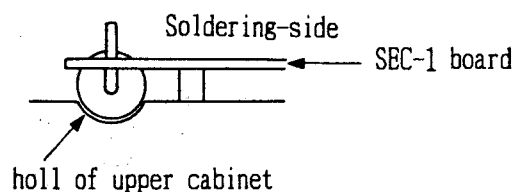


Fig.2

CHAPTER 3

THEORY OF OPERATION

3-1. POWER SUPPLY

This unit is powered from the camera, and it contains a rechargeable Ni-Cd battery to back up the memory (SRAM: IC59) and LSI for clock (IC62). The Ni-Cd battery is charged when the unit is connected to the camera and the power is supplied. Two voltage detectors (IC2, 3) are connected in serial to take the power on-off timing.

3-2. SYNCHRONIZING-PULSE SEPARATION

The composite signals sent from the camera are entered in the buffer (Q2) once. Then, their phases are inverted and they are amplified by the Q1. Next, noise is removed by D50 and IC51. Then, synchronizing pulses are separated by IC52 and 53, and sent to the CPU (IC6) and character generator (IC4, 5) to take timing with camera.

3-3. CHARACTER GENERATOR

Signals generated by the character generator (IC4, 5) pass through the priority circuit (IC57, 60) where the pointer signal generated by IC4 takes precedence, and they are sent to the camera side after RGB composition by IC58.

M50455-079/080FP (IC5, 4)

LSI to control character and pattern display on the TV screen

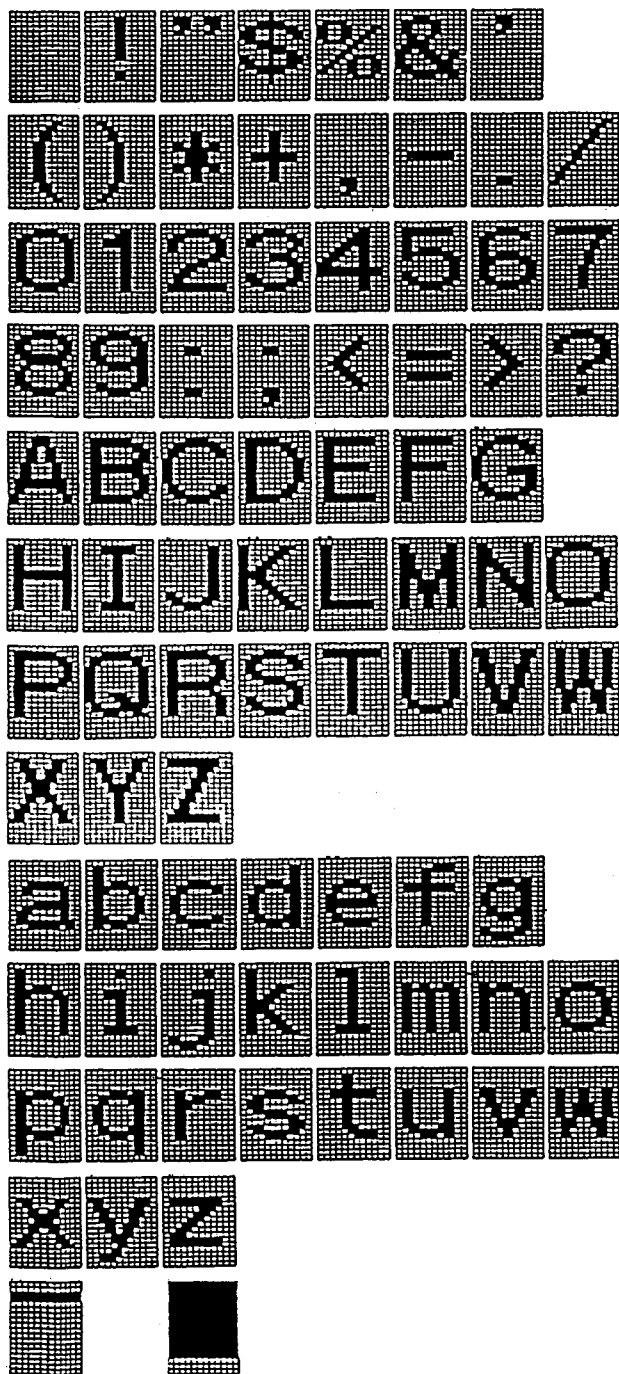
Outline: 32-pin flat package

Functions and features

- | | |
|--------------------------|--|
| 1) Screen structure | 24 characters x 10 lines |
| 2) Characters displayed | 240 characters max. |
| 3) Character structure | 12x18 dots |
| 4) Kinds of characters | 128 kinds |
| 5) Character size | Screen divided into 2, 4x4 kinds |
| 6) Display position | Horizontal 62 kinds
Vertical 64 kinds |
| 7) Blinking | Every character
Cycle approx. 1 or 0.5 sec.
Duty 25%, 50% or 75% |
| 8) Data input | Serial address & data 16 bits each |
| 9) Coloring | Every character RGB 8 colors |
| 10) Blanking | 14x18 dots entire blanking (solid)
Fringe size
Character size |
| 11) Synchronizing signal | Input: horizontal sync. signal
vertical sync. signal
... External synchronization
Output: Composite sync. outputs
... Internal synchronization
(NTSC/PAL)
Video output |

Character fonts used:

Character fonts



Pointer



CHAPTER 4

ADJUSTMENT

4-1. POSITIONING

(Perform the following adjustment when the cursor display range runs out the monitor screen, or it is extremely narrow, or when CV2, L2, C71, IC4, or CV1, L1, C10, IC3 is replaced.)

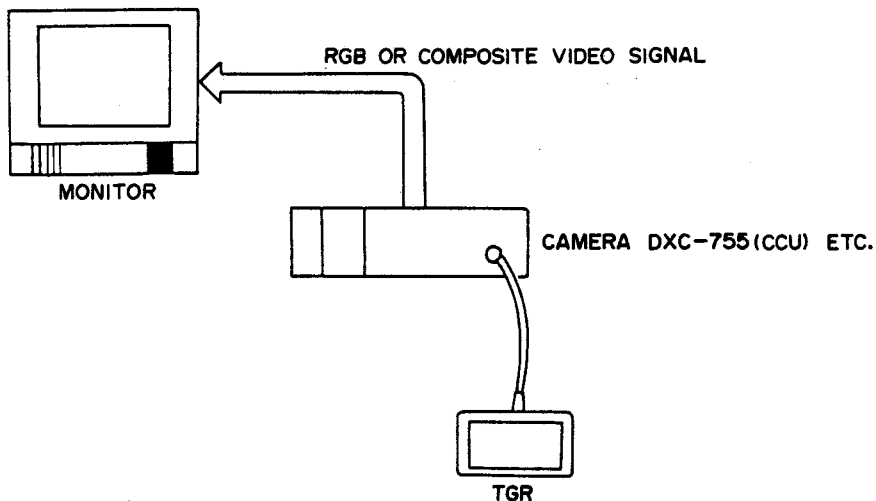
Preparation:

Oscilloscope	Band 100MHz minimum or 2ch minimum
Adjusting tool	Insulated screwdriver
Camera	DXC-755, etc.
Monitor	RGB or COMPOSITE VIDEO input provided

Connection:

Connect camera and monitor.

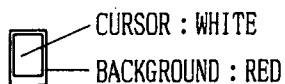
Connect TGR and camera.



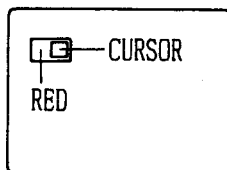
4-1-1. Screen Positioning

Procedure:

- 1) Turn on the power switch on the camera.
- 2) Press the TYPE key. (The cursor appears.)
- 3) Keep pressing the BGND key to select a red background.

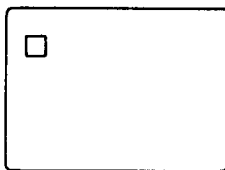


- 4) Press the ENT key. (The cursor moves by one character.)



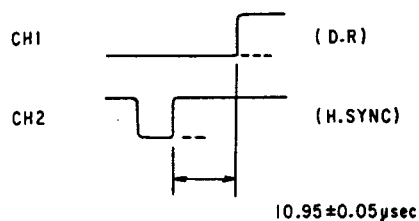
MONITOR PICTURE

- 5) Press the TYPE key in step 4) state so that the cursor disappears.



MONITOR PICTURE

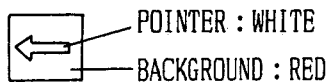
- 6) Connect CH1 on the oscilloscope with TP18 (D, R) and CH2 with TP9 (H.SYNC). (Trigger CH1, +)
- 7) Adjust the CV2 (trimmer) by turning it with a screwdriver so that the following value can be obtained.



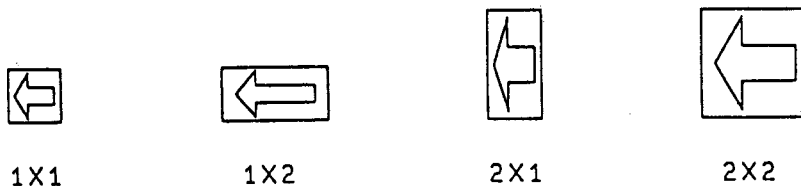
4-1-2. Pointer Positioning

Procedure :

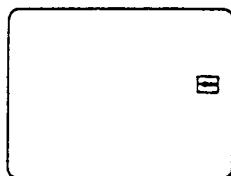
- 1) Turn on the power switch on the camera.
- 2) Press the  key so that the pointer (arrow) appears.
- 3) Keep pressing the  key to select a red background.



- 4) Press the  key and make the pointer (arrow) 2x2 size as shown in Fig.

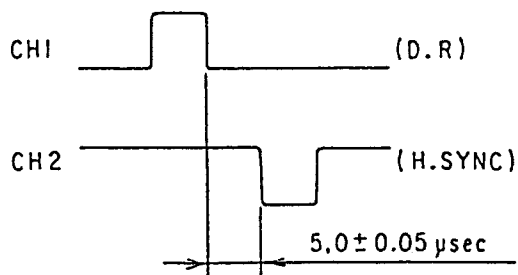


- 5) Keep pressing the  key until the pointer is locked at the right end.



MONITOR PICTURE

- 6) Connect CH1 on the oscilloscope with TP18 (D, R), and CH2 with TP9(H.SYNC). (Trigger CH1,+)
- 7) Adjust the CV1 (trimmer) by turning it with a screwdriver so that following value can be obtained.



4-2. ADJUSTING TIMER OSCILLATING FREQUENCY

(Perform the following adjustment when clock malfunctions, or X2, C79, IC7 or CV3 is replaced.)

Preparation:

Frequency counter	Significant figure 8 digits minimum
Adjusting tool	Insulated screwdriver
Camera	DXC-755, etc.
Monitor	RGB or COMPOSITE VIDEO input provided

Connection:

Same as that in positioning.

Procedure:

- 1) Turn on the power switch on the camera.
- 2) Press the CLOCK key to display the clock, and make sure that it is running.
- 3) Connect the probe of the frequency counter with TP7 (CLOCK) , and GND with negative (-) terminal of battery.
- 4) Adjust the CV3 (trimmer) by turning it with a screwdriver so that the frequency counter indicates the following value.

4096.00 $\pm$ 0.01 Hz

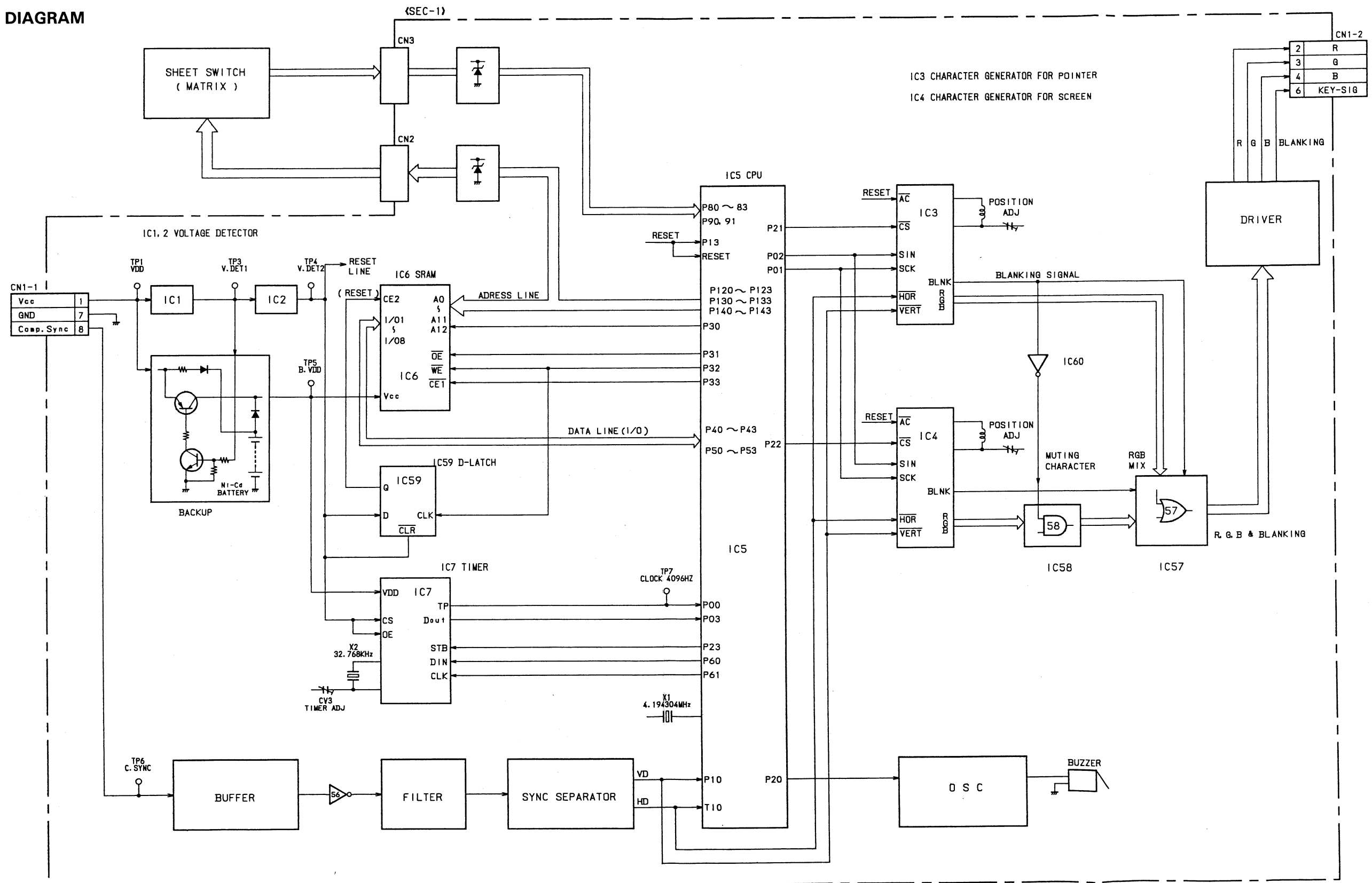
Gate time: 1 sec

第5章
ブロック図・回路図

CHAPTER 5
DIAGRAM

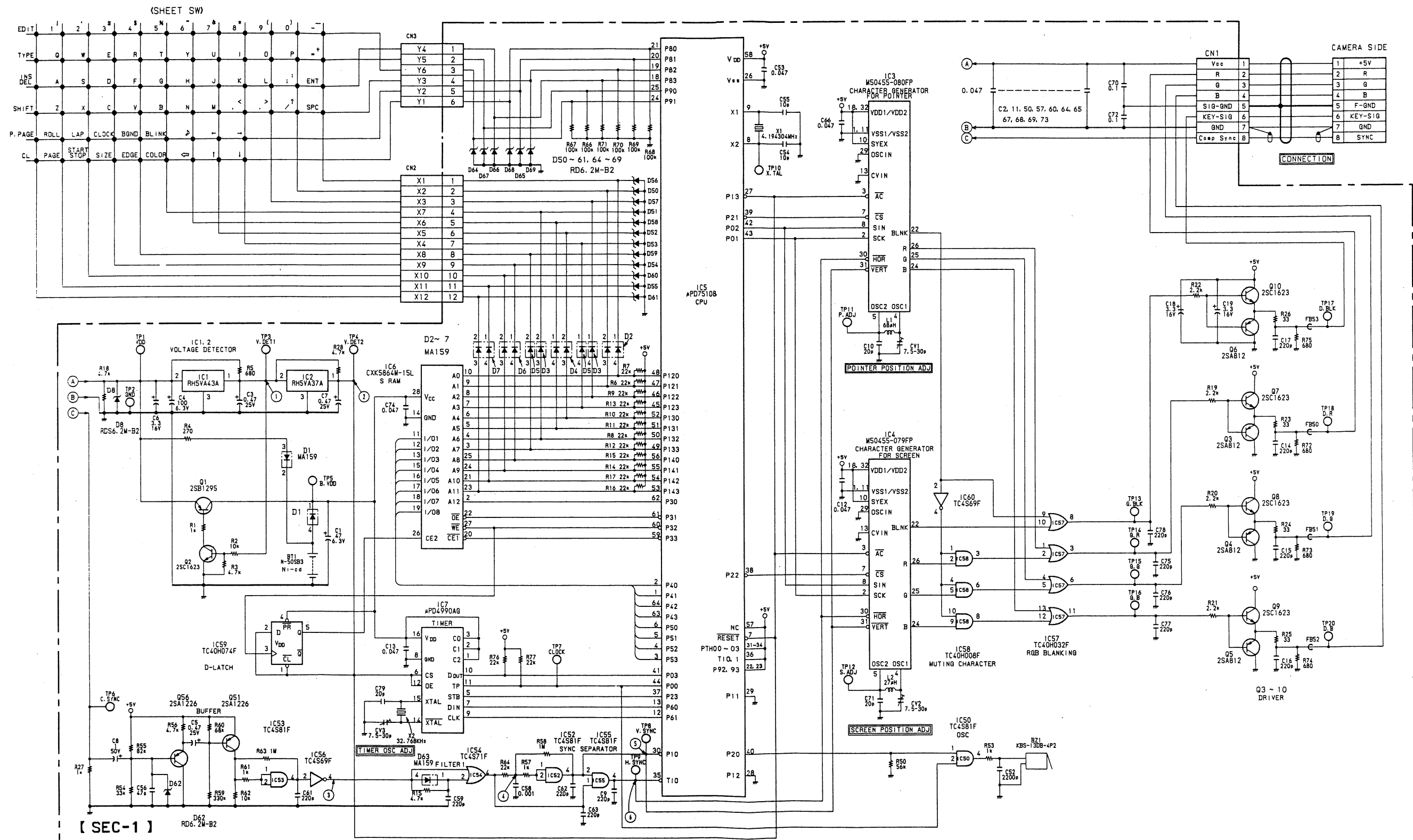
5-1. ブロック図

5-1. BLOCK DIAGRAM



5-2. 回路図・マウント図

5-2. SCHEMATIC AND MOUNTING DIAGRAM



MOUNTING DIAGRAM

COMPONENT SIDE

CN1 G-1
CN2 D-4
CN3 I-4

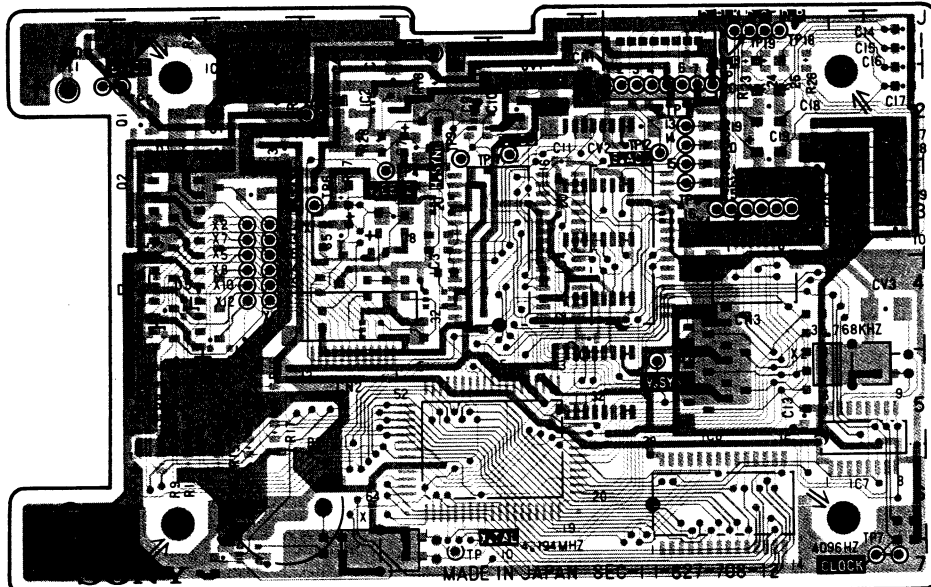
CV1 F-2
CV2 F-2
CV3 J-4

D1 A-1
D2 B-4
D3 B-4
D4 B-5
D5 B-4
D6 B-5
D7 C-5
D8 C-1

IC1 C-1
IC2 D-2
IC3 E-3
IC4 G-3
IC5 E-5
IC6 G-6
IC7 I-5

Q1 B-2
Q2 B-3
Q3 I-2
Q4 I-3
Q5 I-3
Q6 I-3
Q7 J-2
Q8 J-3
Q9 J-3
Q10 J-3

TP1 E-1
TP2 C-2
TP3 D-2
TP4 D-3



TP5	B-2	TP13	G-2
TP6	D-3	TP14	G-2
TP7	J-7	TP15	G-3
TP8	G-5	TP16	G-3
TP9	E-2	TP17	I-1
TP10	E-7	TP18	I-1
TP11	F-2	TP19	I-1
TP12	G-2	TP20	I-1

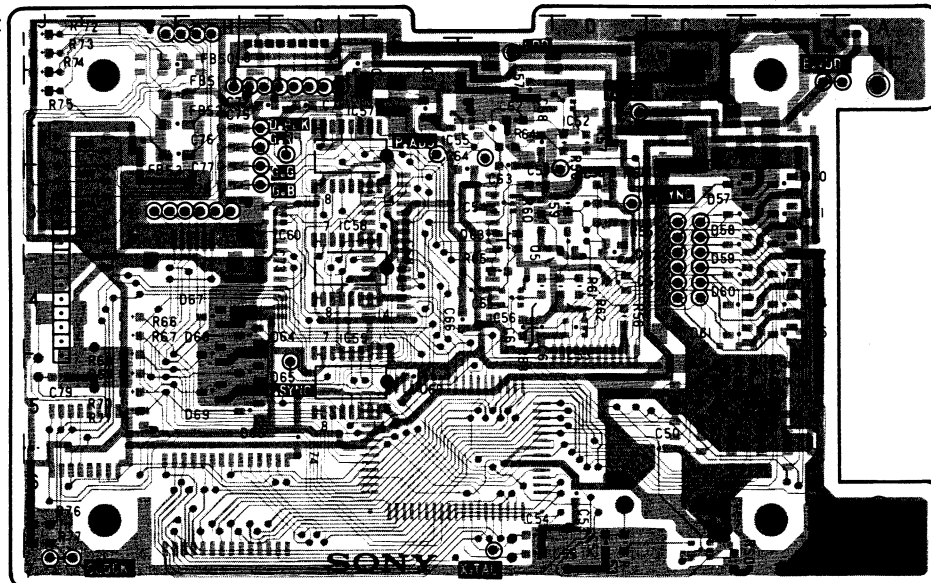
SEC-1 - COMPONENT SIDE -
1-627-708-12
TGR-750(J,E)

SOLDERING SIDE

D50 B-3
D51 B-3
D52 B-3
D53 B-4
D54 B-4
D55 B-4
D56 C-3
D57 C-3
D58 C-3
D59 C-4
D60 C-4
D61 C-4
D62 D-3
D63 E-3
D64 H-4
D65 H-5
D66 H-5
D67 H-4
D68 H-4
D69 H-5

IC50 C-7
IC52 D-2
IC53 D-4
IC54 E-3
IC55 E-2
IC56 E-4
IC57 G-2
IC58 G-4
IC59 G-5
IC60 G-3

Q50 D-4
Q51 D-3



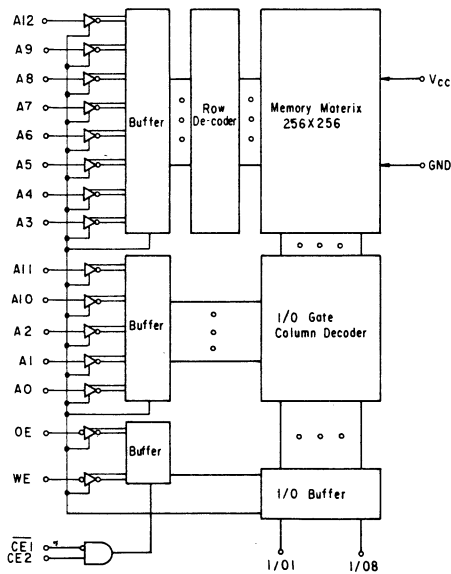
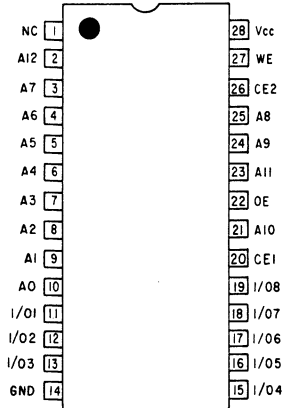
SEC-1 - SOLDERING SIDE -
1-627-708-12
TGR-750(J,E)

第6章
半導体一覧

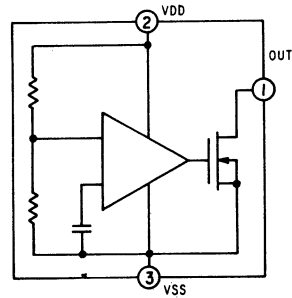
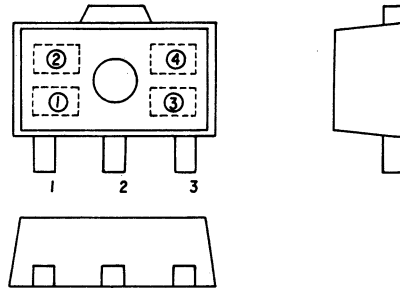
CHAPTER 6
SEMICONDUCTOR PIN ASSIGNMENTS

<u>TYPE</u>	<u>PAGE</u>
2SA1226.....	6-6
2SA812.....	6-6
2SB1295-UL6.....	6-6
2SC1623.....	6-6
CXK5864M-10.....	6-2
M50455-079FP.....	6-3
M50455-080FP.....	6-3
MA159.....	6-6
RD6.2ES-L3.....	6-6
RH5VA37AA.....	6-2
RH5VA43AA.....	6-2
TC40H008F.....	6-2
TC40H032F.....	6-3
TC40H074F.....	6-3
TC4S69F.....	6-2
TC4S71F.....	6-2
TC4S81F.....	6-2
uPD4990AG.....	6-4
uPD75108GF-743-3BE.....	6-5

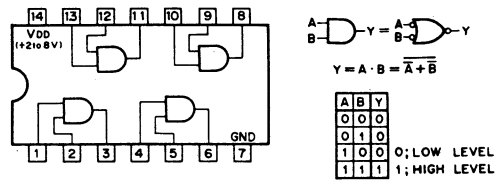
CXK5864M-10 (SONY)
—TOP VIEW—



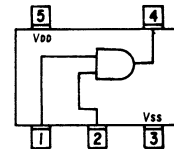
RH5VA37AA (RICOH)
RH5VA43AA (RICOH)



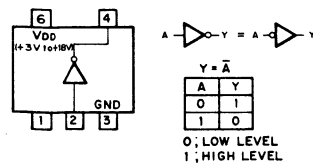
TC40H008F (TOSHIBA) FLAT PACKAGE
C-MOS 2-INPUT POSITIVE-AND GATE
—TOP VIEW—



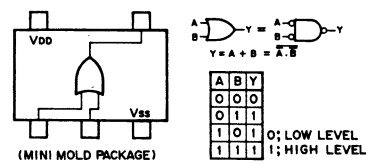
TC4S81F (TOSHIBA) FLAT PACKAGE



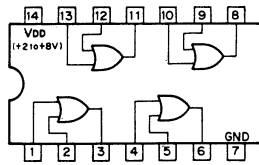
TC4S69F (TOSHIBA) FLAT PACKAGE
C-MOS INVERTER BUFFER
—TOP VIEW—



TC4S71F (TOSHIBA) FLAT PACKAGE
C-MOS 2-INPUT OR GATE
—TOP VIEW—



TC40H032F (TOSHIBA) FLAT PACKAGE
C-MOS 2-INPUT POSITIVE-OR GATE
—TOP VIEW—

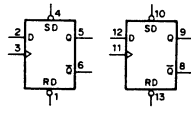
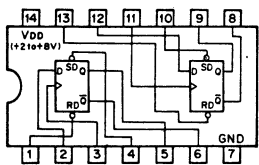


$$Y = A + B = \overline{A \cdot B}$$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

0: LOW LEVEL
1: HIGH LEVEL

TC40H074F (TOSHIBA) FLAT PACKAGE
C-MOS HIGH SPEED D-TYPE FLIP-FLOP WITH DIRECT SET/RESET
—TOP VIEW—



D-MODE

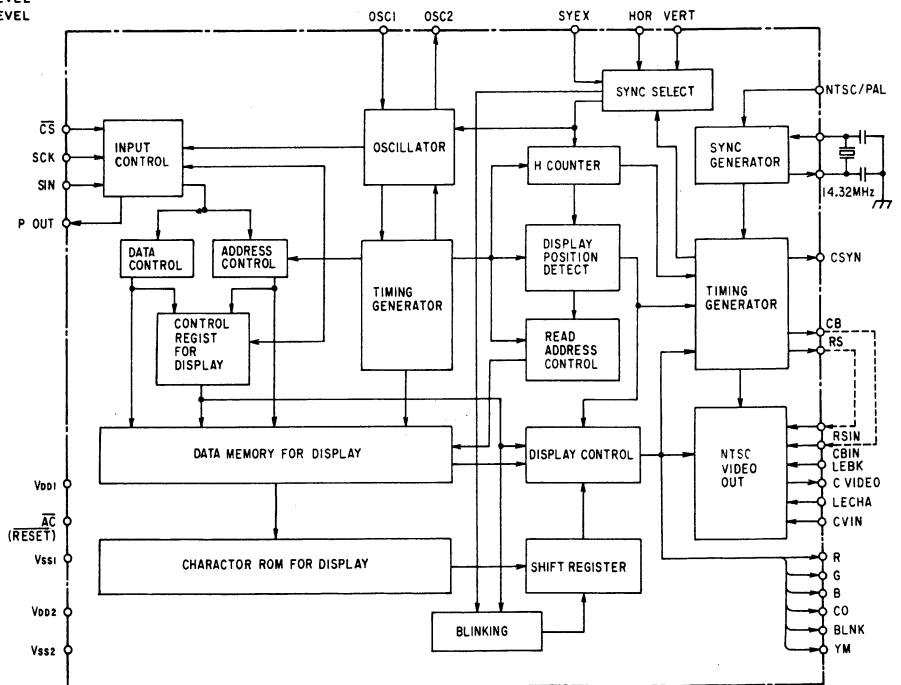
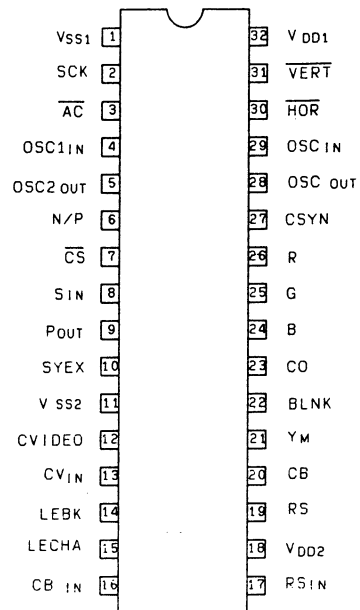
t_n	t_{n+1}
D	Q
0	0
1	1

R-S MODE

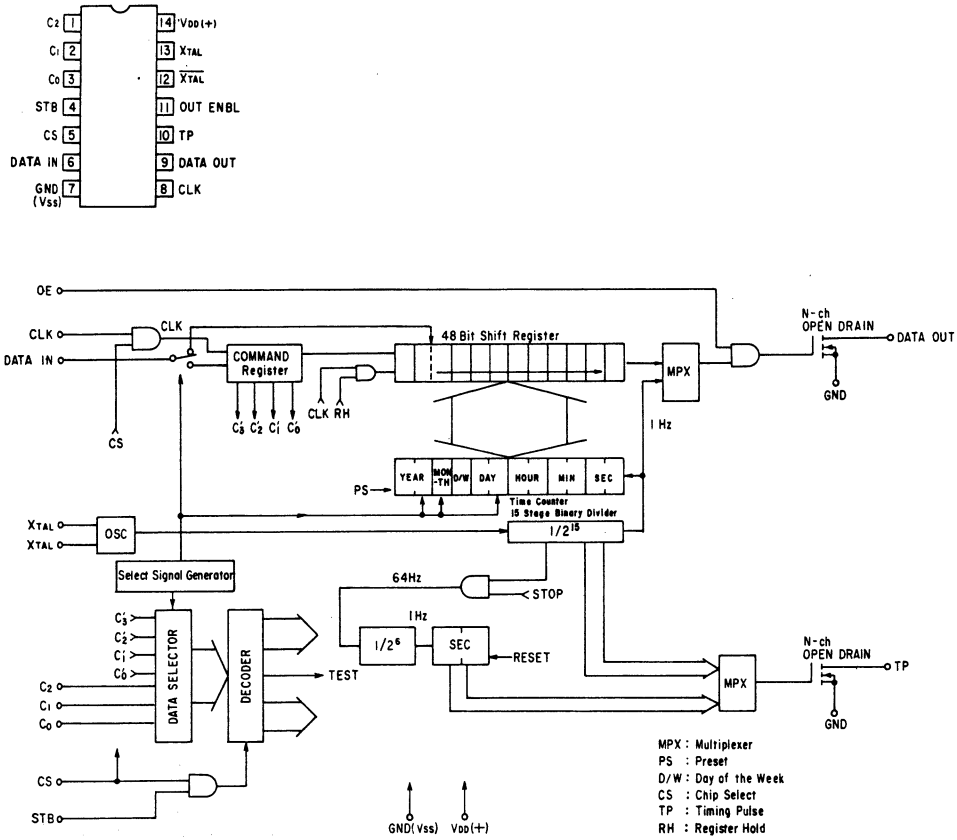
INPUT		OUTPUT	
RD	SD	Q	$\bar{Q}$
0	0	1	1
0	1	0	1
1	0	1	0
1	1	D-MODE	

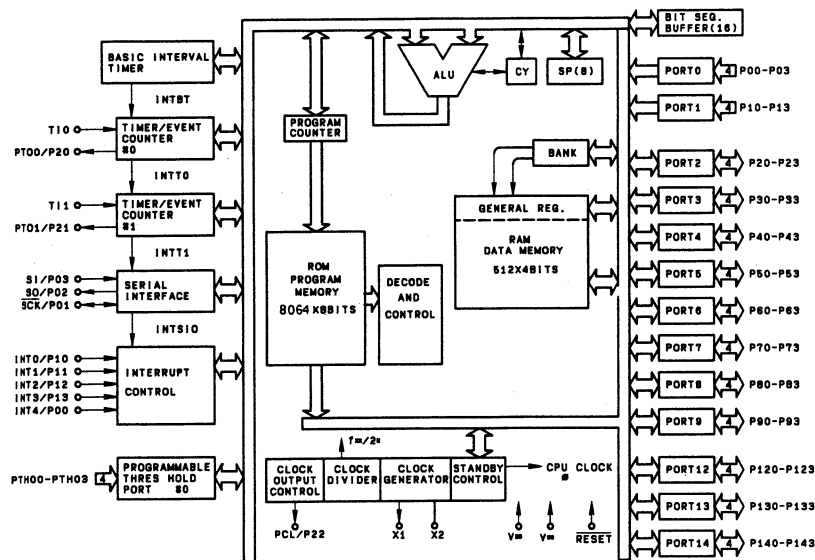
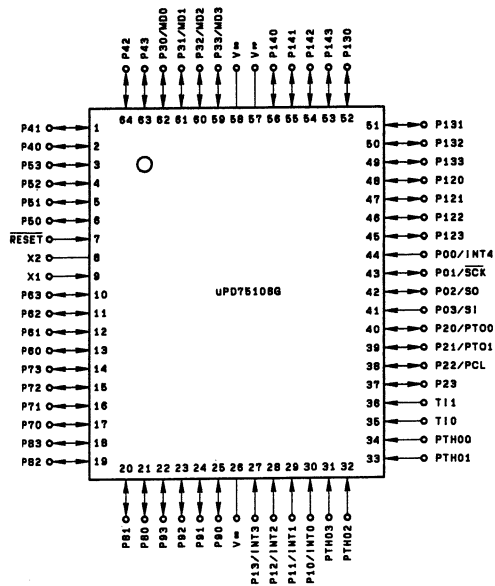
0: LOW LEVEL
1: HIGH LEVEL

M50455-079FP (MITSUBISHI)
M50455-080FP (MITSUBISHI)

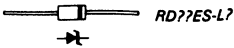
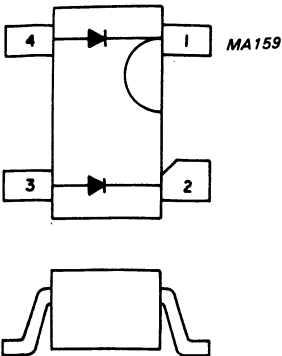


μPD4990AG (NEC)

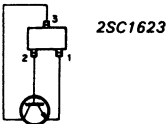
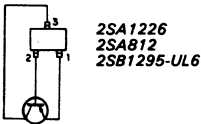


μ PD75108GF-743-3BE (NEC)

<Diode>



<Transistor>

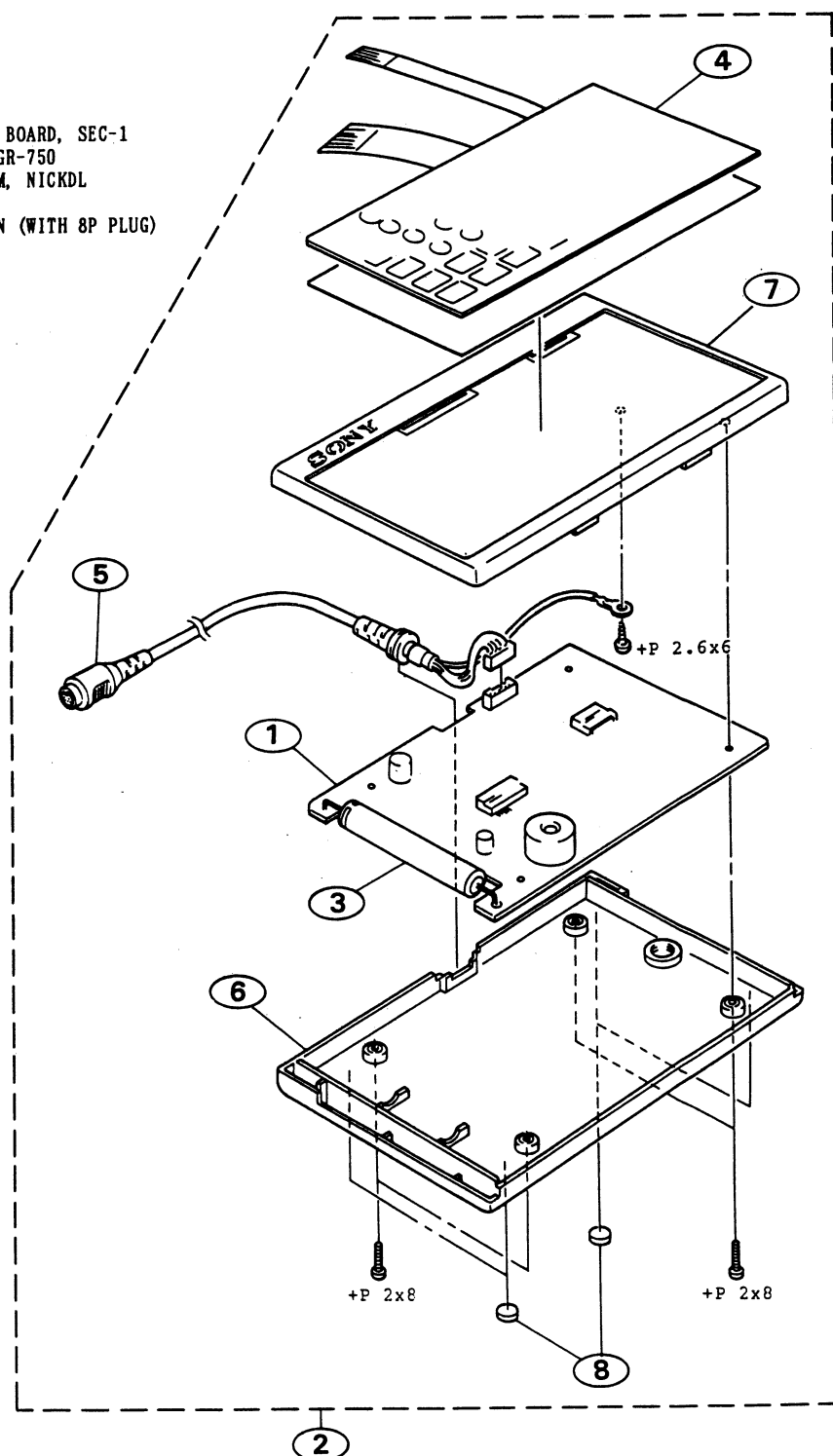


CHAPTER 7

REPAIR PARTS

7-1. EXPLODED VIEW

No.	Part No.	SP Description
1	A-7476-013-A	o MOUNTED CIRCUIT BOARD, SEC-1
2	A-7504-093-A	o OVERALL ASSY, TGR-750
3	1-528-163-11	s BATTERY, CADMIUM, NICKDL
4	1-571-732-11	s SHEET, SWITCH
5	1-574-097-11	s CORD, CONNECTION (WITH 8P PLUG)
6	3-163-901-22	o CABINET, LOWER
7	3-163-902-31	s CABINET, UPPER
8	4-908-723-11	o SPACER (1)



NOTE:

Items with no part number and no description are not stocked because they are seldom required for routine service.

Items marked "o" in the SP column are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

7-2. ELECTRICAL PARTS LIST

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
<u>Electrical Parts</u>					
*A-7504-093-A OVERALL ASSY (E MODEL)					
<u>SEC-1 Board</u>					
BZ1	1-529-069-11	BUZZER, PIEZOELECTRIC	C62	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C1	1-126-205-11	ELECT 47MF 20% 6.3V	C63	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C2	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	C64	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C3	1-135-145-11	TANTAL. CHIP 0.47MF 20% 25V	C65	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C4	1-126-206-11	ELECT 100MF 20% 6.3V	C66	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C5	1-135-145-11	TANTAL. CHIP 0.47MF 20% 25V	C67	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C6	1-135-092-21	TANTAL. CHIP 3.3MF 20% 16V	C68	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C7	1-135-145-11	TANTAL. CHIP 0.47MF 20% 25V	C69	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C8	1-135-076-21	TANTAL. CHIP 1MF 20% 35V	C70	1-163-038-00	CERAMIC CHIP 0.1MF 25V
C9	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	C71	1-163-100-00	CERAMIC CHIP 20PF 5% 50V
C10	1-163-100-00	CERAMIC CHIP 20PF 5% 50V	C72	1-163-038-00	CERAMIC CHIP 0.1MF 25V
C11	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	C73	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C12	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	C74	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V
C13	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	C75	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C14	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	C76	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C15	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	C77	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C16	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	C78	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C17	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	C79	1-163-100-00	CERAMIC CHIP 20PF 5% 50V
C18	1-135-092-21	TANTAL. CHIP 3.3MF 20% 16V	CN1	*1-565-651-11	PIN, CONNECTOR 8P
C19	1-135-092-21	TANTAL. CHIP 3.3MF 20% 16V	CN2	1-565-771-11	CONNECTOR, FPC(1.0MM) (Z1F) 12P
C50	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	CN3	1-565-770-11	CONNECTOR, FPC(1.0MM) (Z1F) 6P
C52	1-164-161-11	CERAMIC CHIP 0.0022MF 10% 50V	CV1	1-141-368-11	CAP, TRIMMER CHIP 30PF
C53	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	CV2	1-141-368-11	CAP, TRIMMER CHIP 30PF
C54	1-163-093-00	CERAMIC CHIP 10PF 5% 50V	CV3	1-141-368-11	CAP, TRIMMER CHIP 30PF
C55	1-163-093-00	CERAMIC CHIP 10PF 5% 50V	D1	8-719-404-12	DIODE MA159
C56	1-163-109-00	CERAMIC CHIP 47PF 5% 50V	D2	8-719-404-12	DIODE MA159
C57	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	D3	8-719-404-12	DIODE MA159
C58	1-163-141-00	CERAMIC CHIP 0.001MF 5% 50V	D4	8-719-404-12	DIODE MA159
C59	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	D5	8-719-404-12	DIODE MA159
C60	1-163-809-11	CERAMIC CHIP 0.047MF 10% 25V	D6	8-719-404-12	DIODE MA159
C61	1-163-125-00	CERAMIC CHIP 220PF 5% 50V	D7	8-719-404-12	DIODE MA159
			D8	8-719-106-08	DIODE RD6.2M-B2
			D50	8-719-106-08	DIODE RD6.2M-B2
			D51	8-719-106-08	DIODE RD6.2M-B2
			D52	8-719-106-08	DIODE RD6.2M-B2
			D53	8-719-106-08	DIODE RD6.2M-B2
			D54	8-719-106-08	DIODE RD6.2M-B2
			D55	8-719-106-08	DIODE RD6.2M-B2
			D56	8-719-106-08	DIODE RD6.2M-B2

NOTE:

1. The shaded and  -marked components are critical to safety.
Replace only with same components as specified.

2. Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref.No.	Part No.	Description	Ref.No.	Part No.	Description
D57	8-719-106-08	DIODE RD6.2M-B2	R6	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D58	8-719-106-08	DIODE RD6.2M-B2	R7	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D59	8-719-106-08	DIODE RD6.2M-B2	R8	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D60	8-719-106-08	DIODE RD6.2M-B2	R9	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D61	8-719-106-08	DIODE RD6.2M-B2	R10	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D62	8-719-106-08	DIODE RD6.2M-B2	R11	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D63	8-719-404-12	DIODE MA159	R12	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D64	8-719-106-08	DIODE RD6.2M-B2	R13	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D65	8-719-106-08	DIODE RD6.2M-B2	R14	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D66	8-719-106-08	DIODE RD6.2M-B2	R15	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D67	8-719-106-08	DIODE RD6.2M-B2	R16	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D68	8-719-106-08	DIODE RD6.2M-B2	R17	1-216-091-00	METAL GLAZE 56K 5% 1/10W
D69	8-719-106-08	DIODE RD6.2M-B2	R18	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W
FB1	1-543-256-11	BEAD, FERRITE	R19	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
FB50	1-543-256-11	BEAD, FERRITE	R20	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
FB51	1-543-256-11	BEAD, FERRITE	R21	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
FB52	1-543-256-11	BEAD, FERRITE	R22	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
FB53	1-543-256-11	BEAD, FERRITE	R23	1-216-013-00	METAL GLAZE 33 5% 1/10W
IC1	8-759-979-65	IC RH5VA43AA	R24	1-216-013-00	METAL GLAZE 33 5% 1/10W
IC2	8-759-979-64	IC RH5VA37AA	R25	1-216-013-00	METAL GLAZE 33 5% 1/10W
IC3	8-759-630-74	IC M50455-080FP	R26	1-216-013-00	METAL GLAZE 33 5% 1/10W
IC4	8-759-630-81	IC M50455-079FP	R27	1-216-049-00	METAL GLAZE 1K 5% 1/10W
IC5	8-759-145-22	IC UPD751Q8GF-776-3BE (ROM)	R28	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W
IC6	8-752-323-54	IC CXK5864M-10 (SRAM)	R50	1-216-091-00	METAL GLAZE 56K 5% 1/10W
IC7	8-759-140-57	IC UPD4990AG	R53	1-216-049-00	METAL GLAZE 1K 5% 1/10W
IC50	8-759-209-97	IC TC4S81F	R54	1-216-085-00	METAL GLAZE 33K 5% 1/10W
IC52	8-759-209-97	IC TC4S81F	R55	1-216-095-00	METAL GLAZE 82K 5% 1/10W
IC53	8-759-209-97	IC TC4S81F	R56	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W
IC54	8-759-209-90	IC TC4S71F	R57	1-216-049-00	METAL GLAZE 1K 5% 1/10W
IC55	8-759-209-97	IC TC4S81F	R58	1-216-121-00	METAL GLAZE 1M 5% 1/10W
IC56	8-759-202-57	IC TC4S69F	R59	1-216-109-00	METAL GLAZE 330K 5% 1/10W
IC57	8-759-201-63	IC TC40H032F	R60	1-216-093-00	METAL GLAZE 68K 5% 1/10W
IC58	8-759-204-51	IC TC40H008F	R61	1-216-049-00	METAL GLAZE 1K 5% 1/10W
IC59	8-759-201-64	IC TC40H074F	R62	1-216-073-00	METAL GLAZE 10K 5% 1/10W
IC60	8-759-202-57	IC TC4S69F	R63	1-216-121-00	METAL GLAZE 1M 5% 1/10W
L1	1-408-787-00	INDUCTOR CHIP 68UH	R64	1-216-081-00	METAL GLAZE 22K 5% 1/10W
L2	1-408-782-41	INDUCTOR CHIP 27UH	R65	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W
Q1	8-729-807-87	TRANSISTOR 2SB1295-UL6	R66	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q2	8-729-100-66	TRANSISTOR 2SC1623	R67	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q3	8-729-100-76	TRANSISTOR 2SA812	R68	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q4	8-729-100-76	TRANSISTOR 2SA812	R69	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q5	8-729-100-76	TRANSISTOR 2SA812	R70	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q6	8-729-100-76	TRANSISTOR 2SA812	R71	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q7	8-729-100-66	TRANSISTOR 2SC1623	R72	1-216-045-00	METAL GLAZE 680 5% 1/10W
Q8	8-729-100-66	TRANSISTOR 2SC1623	R73	1-216-045-00	METAL GLAZE 680 5% 1/10W
Q9	8-729-100-66	TRANSISTOR 2SC1623	R74	1-216-045-00	METAL GLAZE 680 5% 1/10W
Q10	8-729-100-66	TRANSISTOR 2SC1623	R75	1-216-045-00	METAL GLAZE 680 5% 1/10W
Q50	8-729-122-63	TRANSISTOR 2SA1226	R76	1-216-081-00	METAL GLAZE 22K 5% 1/10W
Q51	8-729-122-63	TRANSISTOR 2SA1226	R77	1-216-081-00	METAL GLAZE 22K 5% 1/10W
R1	1-216-049-00	METAL GLAZE 1K 5% 1/10W	X1	1-567-121-00	CRYSTAL 4.194304MHz
R2	1-216-073-00	METAL GLAZE 10K 5% 1/10W	X2	1-527-997-00	CRYSTAL 32.768KHz
R3	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W			
R4	1-216-035-00	METAL GLAZE 270 5% 1/10W			
R5	1-216-045-00	METAL GLAZE 680 5% 1/10W			

NOTE:

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Replace only with same components as specified.

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